Oasys Ltd

LS-DYNA Environment Version 10.1

Update and Release Notes

Oasys Ltd

The software house of Arup

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1 Introduction

The Oasys Ltd LS-DYNA Environment 10.1 suite, dated October 2011 is primarily a bug fixed release of the 10.0 software which itself superseded the 9.4, 9.4.1 and 9.4.2 releases.

This document lists the enhancements that have been made during development of 10.0 and the bugs that have been fixed (both in 10.0 and 10.1). Each “case id” referred to in these lists is unique and should be cited if more information or clarification are required.

Whilst the 10.1 suite is primarily a bug fixed release, D3PLOT 10.1 contains two enhancements:

- On Windows and Linux, D3PLOT 10.1 has been built with a third party library (FFmpeg version 0.8) which is now used to decode a wider range of movie formats.
- A new standalone reader for Femzip is now used to decode models compressed using Femzip. D3PLOT 10.1 will automatically find and use the new Femzip reader, resulting in faster operation than in D3PLOT 10.0 especially with multiple models.

For further details see the D3PLOT enhancements section.

1.1 Compatibility with LS-DYNA releases

The 10.1 release has been used and tested with LS-DYNA version 971 release R5, and supports all the keywords in the LS971 User’s Manual dated August 2010 (except *CASE and *EF). LS971 R5 is now the default keyword output format from PRIMER.

1.2 Hardware platforms supported

The complete Oasys Ltd LS-DYNA Environment 10.1 is available on the following platforms:

Windows	XP, Vista, Windows 7	32 bit
	XP 64, Vista 64, Windows 7 64bit	32 and 64 bit
Linux 2.6 kernel *	Suse 9.0 and 10.0	32 and 64 bit
	Redhat Enterprise 4.0	32 and 64 bit
	Redhat Enterprise 5.0	32 and 64 bit
HP PA-RISC	HP-UX 11.0 and 11.11	64 bit
HP Itanium	HP-UX 11.23	64 bit
Sun	Solaris 8 and 10	64 bit
Silicon Graphics	Irix 6.5	64 bit
IBM	AIX 5.1	64 bit

- We build Linux 2.6 kernel versions on both SuSe and RedHat, however we have found that the executables seem to be completely interchangeable with no problems or loss of performance.
- Note that certain functions are unavailable on Unix (HP PA-RISC, HP Itanium, Sun Solaris, Silicon Graphics Irix and IBM AIX). These include the new movie-reader in D3PLOT (FFmpeg), and in PRIMER certain capabilities involving Unicode characters (for example, Japanese, Chinese or Korean text in Javascript).

1.3 Graphics hardware supported

The default graphics protocol used on all platforms in the table above is OpenGL, which gives good quality 3D performance on a wide range of hardware.

“Legacy” X-Windows (2D only) graphics drivers remain in PRIMER and D3PLOT on Unix and Linux platforms since these are used by a small minority of clients who display over a network of mixed machine types.

The 2D X-Windows driver has been withdrawn from T/HIS for technical reasons, however it is now linked with both hardware OpenGL (the default) and the MESA emulator on UNIX and Linux. MESA emulates OpenGL in software on X-Windows; therefore clients using a mixed machine environment with only 2D X-Windows support will still be able to display graphics.

1.4 FLEXlm Licensing

The version 10.1 software has been compiled using version 11.8 of FLEXlm, the same as version 10.0 (versions previous to this used FLEXlm 10.8). If you have not yet installed version 10.0 you MUST update your FLEXlm licence servers to version 11.8.

The version 10.0/10.1 licence file and licence daemons are backwards compatible with the 9.1, 9.2, 9.3 and 9.4 software releases. This means that any existing 9.1, 9.2, 9.3, 9.4 software will continue to work with the new licence files and servers.

2 Bugs Fixed

The enhancements and bug-fixes for each program have been broken down into a series of topics. Within each topic enhancements and bug-fixes are listed by case ID (most recent first).

2.1 PRIMER

2.1.1 Bugs Fixed in 10.1

Adhesive

- **Case 17511**

After using 'FROM FE' for adhesive, a remake on the resulting connection entities could lead to deformed solid elements in the adhesive. This has been corrected.

Airbag

- **Case 17531**

The reference to an individual chamber from an AIRBAG_PARTICLE card could become corrupted when updating the DEFINE_CPM_CHAMBER card. This has been corrected.

Assembly

- **Case 17970**

The "Build from CSV" panel will no longer permit a build operation unless at least one loadcase has been specified. Additional detail has also been added to some of the error messages.

- **Case 17671**

For 'customer format' assembly comment reading, PRIMER will now no longer create a duplicate assembly with _1, _2 etc. naming convention if the assemblies are referenced in different include files. Instead, it will assume that the references are to the same assembly. There is also a new preference for turning off reading of ‘customer format’ comments.

Belts

- **Case 17871**

It is normally the case in PRIMER that membership of a *SET definition does not 'lock' an item against deletion (unless the user chooses to make this the case).

However this default logic causes problems in a small number of cases where the contents of a set affect the item that references it, specifically 2D ELEMENT_SEATBELT Retractors and Sliprings. In these two cases node and shell sets are used to define the geometry of the elements, and removing anything from them will generate errors.

Therefore the concept of 'locking' set contents has been added, with three possible

settings:

(1) Automatic. PRIMER behaves exactly as before, except that when removing items from sets during deletion it checks first to see whether that set is used by any of the known cases where item removal will cause problems. If this is the case then the set locks the item, otherwise it is free to be deleted. This is the default, and we recommend to use it in most circumstances.

(2) Always unlocked. This is the original PRIMER behaviour: membership of a set will never lock items against deletion.

(3) Always locked. This is a new setting, and if chosen then sets will always lock items against deletion.

This 'locking' setting is controllable on the set editing panel, and it only applies to the current session of PRIMER. (Its status is not stored in the keyword output file.)

- **Case 17843/17125**

The belt fitter in PRIMER has had a tendency to produce initial penetrations when the as-fitted belt is run through the contact checker. The belt fitting, contact and depenetration algorithms have been rewritten and improved, specifically:

- Contact parameters on the *PART_CONTACT card were previously ignored, but are now considered.

- Contact into solid elements now uses a better means of determining whether penetrating nodes on the belt are 'inside' or 'outside' the element. Previously fitting against a relatively thin solid mesh could cause problems because the fitter would think it was 'behind' the inside face of the solids.

- The distribution of movement to nodes on belt facets when penetrated by dummy/seat/structure nodes has been improved to make it more realistic.

- The depenetration algorithms now consider 'radial' edge contact for the edges of belt shell facets, in the same way that LS-DYNA does.

In addition several enhancements to belt fitting have been added to 10.1 These are:

- Transverse twist at belt end and fixed points (e.g. at sliprings) can now be controlled. (Previously only the outward radial direction could be changed.)

- The maximum transverse curvature of the belt can now be controlled during fitting. This stops a multi-row belt 'digging into' concave geometry on the structure.

- All belt fitting parameters can now be specified in the oa_pref file.

The updated fitter has been tested on a range of geometries that previously gave penetrations, and all of these now give 'clean' results in the contact checker.

- **Case 17759**

When the Element Shell keyword editor was used to display seatbelt shell elements it displayed all their data fields correctly. However if an attempt was made to edit N3 or N4 this did not work correctly.

This was because it was confusing N3 and N4 for seatbelt shells with N3 and N4 for normal shells - the two element variants use different columns for these data.

This has now been fixed.

- **Case 17758**

Various problems were found with seatbelt retractor elements:

When reusing a retractor during belt fitting (including auto-refitting) any elements inside the retractor were pretty much ignored - as in left unchanged - and would not be joined up with the new / revised belt mesh.

When swapping between 1D and 2D belts during meshing the number of rows of elements inside the retractor was ignored, effectively being reset to zero.

A minor issue, but the retractor panel referred to 'number of elements inside', which was fine for 1D belts, but caused confusion for 2D. It is actually the number of rows of elements inside, and has been amended to say that.

No checking of belt topology inside the retractor was performed, with result that a disjoint belt (or other meshing errors) was not detected.

If the retractor panel was used to create belt elements inside the retractor it would get this correct if there were no existing elements inside, joining them correctly to the 'mouth' element(s). However if there were already existing elements inside and this quantity was changed then it would attach the new elements to the mouth elements as well, rather than tacking them onto the free end of the existing mesh.

The retractor panel allowed you to add belt elements inside a retractor, but not to remove them.

All the above problems have been fixed, and error checking of the topology of belt elements inside a retractor has now been added.

- **Case 17693**

When meshing or remeshing a belt, the fitter could get confused, possibly leading to a crash, if an existing slipring was found at an end of a belt definition. This could happen if a subset of a belt, with a slipring at its end, was (re)meshed in isolation. The attempt to create (an illegal) 'one sided' slipring caused the error.

This was caused by the logic that attempts to reuse retractors and sliprings: it found the slipring and associated it with the belt point without checking whether or not it was an intermediate point.

This has been fixed.

- **Case 17585**

PRIMER now checks that the orientation of all 1D seatbelt elements in a belt definition is consistent, so that elements feeding through a slipring behave correctly. This check includes belt elements 'inside' a retractor, and a warning is given if these elements don't match the rest of the belt.

However when PRIMER was used to create (new) belt elements inside a retractor no check of orientation was made, so there was a chance that these new elements would point the 'wrong' way, and hence trigger a warning in the orientation check. This didn't in fact matter because these elements would be very unlikely to feed through a slipring, but it was still an error in PRIMER.

This has now been fixed: when new 1D belt elements are created inside a retractor their orientation will now match that of the 'mouth' element immediately outside it.

- **Case 17563**

Two problems arose with retractors and sliprings:

(1) When a retractor was modified (label changed, sensor added) there was a very long pause before the model updated, and this was accompanied by apparently unrelated warning messages about nodes in time-history blocks not being renumbered.

This occurred because the model in question had include files, and label ranges were specified for items within those files. Updating a retractor, which might (but did not in this case) have created seatbelt elements within the retractor was being passed though the 'check for all labels being in valid ranges' logic.

This was unnecessarily time-consuming, and the creation of belt elements inside a retractor has been modified so that it will create them with the right labels, making the check unnecessary.

(2) Primer expected labels of sliprings within the same belt definition to be continuous without gaps. If the user renumbered the sliprings such that this was no longer the case, various problems occurred with the seatbelt fitter; and similarly for retractors and nodal rigid bodies within the same belt definition.

PRIMER now checks for this situation during keyword input, and will renumber these item types in a *BELT definition if required so that they form a contiguous label range.

- **Case 17501**

A problem with belt fitting was identified where two (separate) belt definitions had sliprings in very similar positions. The example in question was for a rear seat in which two belt buckle points were close together.

The first definition was created correctly, but when the second one was defined it picked up the slipring from the first one. This was because the belt fitter looks for retractors and sliprings near to belt points - correct in itself - but no check was made to see if these were already in use on a different belt.

This problem has been fixed.

In testing the fix it also became clear that two belt definitions that had item label ranges immediately 'next to' one another (i.e. belt #1 had labels 1 to n, and belt #2 had labels n+1 ...) could run into problems if their belts were refitted automatically.

The auto-refit process tries to keep the label ranges of the new belt as similar as possible to those in the original definition, and this was causing clashes with the labels in the adjacent belt.

This too has been fixed.

- **Case 17455**

There was an error in the output of *BELT_PATH data that would affect matters if the architecture of the machine reading the keyword file was different to that on which it was written.

The values of belt path twist were written in a way that accidentally encoded the 'endian swap' status of the machine, so reading them back in on a machine with a different endian swap resulted in these numbers being garbled.

In practice most modern machines are Windows or Linux based, running on 32 bit x86 or or 64 bit x86_64 architecture, and these all share the same endian swap status. However older Unix machines tend to have the opposite endian swap status, so it was only when files were transferred between 'old' and 'new' machines that this problem arose.

This has now been fixed.

Checking

- **Case 17882**

Checking of *ELEMENT_SEATBELT_RETRACTOR could report wrongly that the loading curve did not start with a +ve force value (i.e. a minimum tension) at time = 0.

This would occur if the first point in the curve was (0,0), but an offset had been used to offset the Y axis values. The evaluation of the curve was not taking into account the offset. This has now been corrected.

- **Case 17830**

VOL = 0 on *SECTION_BEAM with ELFORM = 6 is allowed if material is of type 71, previously this would be wrongly identified as an error.

- **Case 17766**

There is an autofix in PRIMER which, for entity types that can be labelled or unlabelled (e.g. *AIRBAG, *CONTACT), converts all items to labelled type. When applied to *AIRBAG this 'fix' corrupted the data. This has been fixed.

- **Case 17570**

Previously, PRIMER would not allow you to specify an EQOS field on a part card if the part had a section type of SHELL. PRIMER would also give error messages for the above. This is valid in LS-DYNA if ELFORM=12-15 or the section type is ALE2D, so PRIMER has been modified to allow this.

- **Case 17493**

When editing *SET_NODE_ADD_ADVANCED an error was wrongly given by PRIMER when the set contained a set with the same label, even though it had a different type (e.g. *SET_NODE_ADD_ADVANCED 101 containing *SET_PART 101). Now fixed.

- **Case 17461**

If a contact is defined with a shell set that contains latent shells (shells that do not exist in the model), checking the model or the contact could cause PRIMER to crash. The workaround in PRIMER 10.0 is to run a cleanup unused to remove the latent shells before running a model check. This is now fixed in PRIMER 10.1.

- **Case 17215**

When multiple *Database_history_xxx_set definitions contain the same item, the error count reported by model check was incorrect. This is now fixed.

- **Case 15702**

When using the Control Modify menu, the “Check CTRL” button would ignore any changes made by the user to the timestep data when performing checks on model timestep and added mass. It has been corrected to use values currently showing in the menu.

Clipboard

- **Case 16479**

When finding referenced items to a part on the clipboard, PRIMER would 'find' any *CONSTRAINED_SOIL_PILE cards that referenced that card, and in turn would find any other parts/part sets referenced by the constrained card. This has been modified to not find the constrained items and the items it references.

Comments

- **Case 17298**

Extra header comments could be saved to the master file of a model containing include files that:

a) Do not start with *KEYWORD, and
b) Do not themselves contain any header comments.

This has been corrected.

Connections

- **Case 17815**

In models with complex contact definitions, the connections panel could incorrectly report that welds are NOT-CONNECTED when in fact they are. This has been corrected.

- **Case 17503**

PRIMER's function to make connections from existing MAT100 welds (on model check or when the connections button is pressed) was failing to exclude beam elements where the nodes were constrained directly or had lumped masses attached. This has been modified to do so.

- **Case 17502**

The connection error message that layer definition is inconsistent with ELEMENT_BEAM_PID could arise spuriously in models where welds are made outside PRIMER and the connections created when the model is checked. The test has been made more robust.

Contacts

- **Case 18078**

Contact penetration fixing could result in a crash if penetrations or crossed edges were fixed manually by dragging the offending nodes or elements out of contact.

This problem has now been fixed.

- **Case 17930**

The contact checking function which reports gaps for sliding contact and its corresponding fix function which moves nodes to remove gaps (or get nodes to tie) was incorrectly being limited to shell vs shell contact. This restriction has been removed.

- **Case 17873**

PRIMER would not allow you to read a model with a contact card that contained an invalid mstyp field. This has been modified to allow the reading of the model, and will print a warning message instead.

- **Case 17556**

When the penetration check panel is applied to a tied contact containing beams defined by part on the slave side, the count of untied nodes is incorrectly including the beam 3rd nodes should they be defined and out of tying range. The contact penetration/tied check has been corrected to ignore beam 3rd nodes.

Contour

- **Case 17702**

The timestep calculation and added mass for MAT_ARUP_ADHESIVE when it uses non-zero BTHK for the bond thickness was incorrect. This has been fixed. Note that the timestep and added mass calculation in LS-DYNA (with BTHK non-zero) has been corrected in LS971 R6. Primer 10.1 matches LS971 R6 in this respect.

Control

- **Case 17611**

The field PSNFAIL on the *CONTROL_SHELL card could be written out incorrectly. This has been corrected.

Cut section

- **Case 18008**

In the cut section properties panel the filename generated for output to .CSV or .BMP files would be incorrectly modified if:

- The previous name was not of the form path/name_nnn.ext
- And the 'path' above contained a '.' character.

Now fixed.

- **Case 17967**

The cut section 'Properties' panel calculates the geometric and structural properties of the elements cut by the current section plane. However where the element mesh was rectilinear and the cut plane was positioned exactly on a mesh line the result would tend not to show any element being cut at all. This was because such a cut was ill-conditioned, effectively lying in the infinitely small gap between adjacent elements.

However graphical output would show the cut elements, so there was an inconsistency between what was shown in the graphics window and what was drawn and calculated in the properties window.

To solve this problem the cut section properties panel now detects this ill-conditioning and, for the affected elements, moves the cutting plane by a very small distance in its +ve Z (outward normal) direction and then repeats the calculation.

This means that for cut section planes located exactly on a line of nodes in a rectilinear mesh the elements being cut will be those on the +ve Z side of the

plane. This is an arbitrary decision, but it is better than the alternatives of not cutting the elements at all or - worse - cutting elements on both +ve and -ve side to give double the correct properties.

If it is important to cut particular elements the solution is to move the plane so that it intersects them unambiguously.

Database

- **Case 17687**

'Update' on the DATABASE_HISTORY panel was causing all the database items to be put into the current layer. This has been fixed so that pre-existing database items remain in their original layer.

- **Case 17456**

Clicking the 'Auto Create' button in the *DATABASE_CROSS_SECTION editing panel would reset LENL and LENM in previous versions of PRIMER. This has been fixed.

Deleting

- **Case 17789**

PRIMER 10.0 suffered from a memory 'leak' during model deletion.

This meant that approximately half of the memory used to store a model was not returned to the pool of memory for future use, but rather was 'lost' in a way that meant it was still being used by the PRIMER process, but could not be reused.

For a single model this did not matter, but if a user repeated the cycle read model / delete model / read model several times, memory usage would continue to build up until no more was available and the PRIMER process would crash or give unpredictable errors.

This has been fixed, and model deletion now returns memory correctly to the 'free for reuse' pool, and successive read / delete / read cycles should not build up excessive memory usage.

- **Case 17518**

If a *SET_SEGMENT_GENERAL definition is used then the [Remove] Cleanup unused function may consider that it is empty, and therefore a candidate for deletion, even if it does actually have some contents.

This because of an error in working out the set contents, and applies only to the _GENERAL variant of *SET_SEGMENT.

This has been fixed.

- **Case 17289**

*BOUNDARY_PRESCRIBED_MOTION cards are now not flagged for deletion if some nodes this card references are flagged for deletion during a model cleanup.

Dummies

- **Case 17608**

“Dyna-method” dummy positioning can produce an analysis where the dummy has further to move than necessary during the analysis (the analysis is valid though). This has been corrected.

Elements

- **Case 14891**

PRIMER gave a harmless error message if the user pressed a shortcut key in the split shell 'failed elements' confirmation box. Now fixed.

Formfx

- **Case 18055**

In the Forming panel, where stresses and strains can be mapped from a source 'forming' model onto a target 'crash' model, the result would be wrong for shell stresses and plastic strains if, and only if, the option to 'reflect about Y = 0' was used.
This has been corrected.

General

- **Case 18111**

Primer could (rarely) crash when closing the 'Find' panel. This has been fixed..

- **Case 17742/17595/17492**

PRIMER could occasionally refuse to respond to menu clicks in the Model Write panel, and give error messages saying something like:

%%% ERROR %%%
Bad : 10102 in DB_PROCESS_OBJECT_BOX

This was due to screen-picking getting confused by a very fast sequence of mouse movements, and thinking that it was still in a picking mode when in fact it was not. This caused menu clicks to be directed to the wrong, and no longer existing, window giving the message above.
This has been fixed by a more robust internal way of shutting down screen-picking when an object menu is dismissed.

Geometry

- **Case 17820**

An error in the IGES reader which caused PRIMER to crash when reading an IGES file with certain types of contents has been fixed.

Graphics

- **Case 17869**

It was sometimes the case that a newly created item, e.g. an element, might not be drawn. This was traced to the following sequence of events:

(1) Blank all of a particular type, for example the part in which the new element will be created. This could be done explicitly or implicitly by choosing 'only' something else.

(2) Create the new element using the blanked part.

PRIMER does not draw it because its graphics category is still marked as 'all blanked', and it has not realised that adding new content to this category means that this must be changed.
This has been fixed by making sure that whenever a new item is created the graphics of its 'owner' category is updated to reflect the fact that it has new content.

- **Case 17816**

PRIMER will no longer resize the graphics window when a model is deleted.

- **Case 17769**

If a beam was defined with neither the _ORIENTATION option nor a third node defined, sometimes the drawing of the true section could go wrong. This has been fixed.

- **Case 17103**

Sketching is normally 'not background colour', which means white if the background is dark, or dark if it is light. Overlay colour (for element boundaries is normally grey.
However if the hidden overlay colour is the same as the sketch colour it does not show up, so a further test has been added to check that 'sketch colour is not overlay colour'. If, for example, the background is white and the overlay is black, sketching will be drawn in grey.

- **Case 16564**

The direction of the arrow that displays LOAD_NODE by moment (d.o.f. = 5/6/7) was shown incorrectly for a -ve moment. This is now fixed.

IPP (Instrument Panel Pendulum impact set-up)

- **Case 17971**

Drive mapping for the output directory name used by IPP model build module was not working when a unix path was read from the csv file on a windows machine. This has been corrected.

Include

- **Case 18073**

PRIMER could refuse to read a *INCLUDE_STAMPED_... definition if the path of the include was defined as relative, and the definition was within a nested include file. This has been corrected.

- **Case 18072**

When writing out a *INCLUDE_STAMPED definition with relative path names on windows where the stamped information lived on a different drive, you got the line '*INCLUDE_STAMPED_PART' written twice. This has been corrected.

- **Case 17495**

PRIMER would crash when adding an include file when the filename started with whitespaces. Now fixed.

Include transform

- **Case 18060**

PRIMER could crash if the label popups were used on the *DEFINE_TRANSFORMATION editing panel if the card did not have any TRANSLATE, ROTATE etc. entries.

Additionally PRIMER could give a warning about negative labels for include files if it contained *CONTACT or *RIGIDWALL cards which did not have _ID set.

- **Case 17718**

Keyin of *INCLUDE_TRANSFORM which contains clashing labels because the label offsets have not been correctly set, can give a crash on some platforms. This has been fixed.

Keyword

- **Case 17749**

In the generic keyword editor it is possible to sort entries by a given column by clicking on that column header. This logic failed after the following sequence of operations:

- Sort by a column.
- Change which keyword suffices are active, increasing these.
- Repeat the sort by column.

This has now been fixed.

- **Case 17745**

Keyout out of *SECTION_SOLID_EFG incorrectly changed legitimate values of zero to non-zero settings which could cause a problem. In LS-DYNA a value of zero means use the default, so should not be changed by PRIMER.

- **Case 17673**

A crash could occur when reading a model containing *TERMINATION cards. This has been fixed.

- **Case 17592**

The *CONSTRAINED_RIGID_BODY panel could open up with the text box input buttons not fully showing. This has been corrected.

- **Case 17591**

Some requisite buttons would stay inactive under certain circumstances in the *CONSTRAINED_SOIL_PILE editing panel. Also, the 'Create' button would, sometimes, be available before some mandatory data had been supplied. These issues now have been fixed.

Kwd editor

- **Case 17751**

SKETCH_ALL off the keyword edit panel when applied to populous items of large models (such as shells) was found to be unnecessarily slow. This has been fixed.

- **Case 17457**

The *SECTION generic keyword editor worked correctly, except that if multiple rows were highlighted, an edit to a row that had a _TITLE suffix would not propagate to rows without it, or vice-versa.

- **Case 17333**

When the keyword editor is invoked for a keyword a crash can occur if:

A visible row in the editor shows an item that has keyword comments and that row contains data fields that have parameters. This causes a formatting error that leads to a crash.

This has been fixed.

- **Case 17299**

Text edit of keywords in the Keyword menu did not work correctly. When the text editor was closed the keyword was updated correctly but PRIMER gave continual error messages. Now fixed.

Text edit of keywords from the Keyword menu ignored any new entities typed in by the user in the text editor. The new entities are now read and installed into the model.

Labels

- **Case 17323**

When node labels are drawn, coincident nodes usually show up because the two labels can be seen overwriting each other. In PRIMER 10.0 it could sometimes happen that only one of the two labels was drawn. This meant that the user did not receive any visual warning of coincident nodes, making them harder to detect.

The algorithms used have been 'tweaked' slightly, with the result that coincident nodes will now be labelled.

Local axes

- **Case 17459**

Local material angles were being displayed incorrectly for certain materials when AOPT was set to 2. This has been fixed.

Macro

- **Case 17944**

A macro would fail when selecting entries in the part table when in 'part modified' mode. This has been corrected.

- **Case 17943**

PRIMER would not record/playback a macro correctly if a static item type (an entity that can only exist once in a model, for example a control card) was selected in the XREF tree viewer or the Model Modified tree viewer. This has been corrected.

- **Case 17790**

Macro 'auto recording', invoked by the 'macro_auto_record' preference, worked OK. However it launched the macro panel in playback mode, despite the fact that it was actually recording.

This has been fixed, and the panel now launches correctly in record mode.

In addition while recording macros (either manually or automatically) an echo of each command is sent to the dialogue box. This can slow down processing so options to send this to dialogue box and/or terminal window (or neither) have been added. Preferences have also been added to set defaults for these options.

- **Case 17525**

An error in the generic keyword editor during the playback of macros has been identified. It is possible that this could result in operations not working correctly, or being applied to the wrong data rows.

This has been fixed.

- **Case 17286**

The button width was not calculated correctly for Unicode text in a macro Pause command so the text could be truncated. Now fixed.

- **Case 16999**

The Quick pick label settings popup did not work correctly with macros. Now fixed.

Mass

- **Case 17803**

Use of 'mass of visible elements' function from the 'Mass Prop' tool could result in incorrect calculation of model mass when subsequently using the function off the part tree drop-down. Other functions were not affected. This has been fixed.

Materials

- **Case 17951**

PRIMER could not read *MAT_MOMENT_CURVATURE_BEAM. This has been corrected.

- **Case 17950**

*MAT_TABULATED_JOHNSON_COOK was being written as *MAT_TABULATED_JONSON_COOK.

This has been corrected.

- **Case 17767**

MAT_84: New fields and a new card are now correctly available for different values of rate as given below:

1) Card 5 with new fields for rate = 3 and 4
2) Card 6 for rate = 6.

- **Case 17475**

An error message for part definition is displayed if the part is constituted of beams having type other than 6 and material for this part is either 66, 67 or 68.

Mechanism

- **Case 17680**

A mechanism containing hinge joints appeared to lock up (refused to move).

This was in fact a modelling error, as the permitted +/- rotation angles of one of the joints had inadvertently been set to zero.

However this was a difficult error to find, and even if it had been intentional it is an inefficient way of 'locking' a joint, so a check is now performed for this situation. If found the user is warned and given a series of possible actions.

- **Case 17587**

The mechanism positioner crashed when attempting to drag a mechanism that referenced a child (dummy) which was not present in the model.

The workaround was to remove the reference to the non-existent child, whereupon it worked correctly, however PRIMER should have detected the problem without crashing.

A check has now been added to the mechanism positioner to detect this situation

which, if found, will result in a warning message and the child definition being ignored.

A test has also been added to the main 'check' function for mechanisms so that this situation will be detected during a model check operation.

- **Case 15077**

In mechanism positioning the permitted slide distance for line joints causes some confusion, since both +ve and -ve permitted slide distances are input as +ve values. The -ve distance actually a permitted amount of travel in the -ve local axis direction.

To try to clarify matters, and to preserve backwards compatibility, it is now possible to enter the -ve distance field as either a -ve or a +ve value. The absolute value will be used.

Menus

- **Case 17955**

Buttons could be mapped incorrectly on the set edit panel (and possibly others) when opening a second panel after the first one was closed while picking an item. This has been corrected.

Merge

- **Case 17858**

PRIMER could refuse to merge 2 nodes together if the nodes were in the same node set. Now fixed.

Mesh

- **Case 17884**

The 'remesh area' function has been improved so that the whole adhesive run is remade if the path of the adhesive crosses the remeshed area.

- **Case 17852**

When the remesh area function was used on a panel with connections (even if these were not in the vicinity of the remeshed patch), the connections could be emptied and left in a failed state. Bringing them to the table and remaking them was then necessary. This has been fixed. The connections that lie in the vicinity of the re-meshed area will be remade automatically and only put to the table if they fail.

- **Case 17795**

Changing the element size when remeshing an area reset the shell selection. Now fixed.

- **Case 17734**

Remeshing an area could crash if the area was not a 'simple' surface (i.e. more than 2 shells share an edge). Now fixed.

- **Case 17691**

The function which remeshes an area was implicitly trying to remake connections across the whole part concerned. These connections were failing to make and being sent to the table where they subsequently would remake without a problem. The logic which determines which connections to re-make has been corrected.

- **Case 17689**

An error which could occasionally cause 'remesh area' to crash has been fixed.

- **Case 17664**

The use of Tools->Mesh->Offset to produce solid elements from a shell mesh could result in -ve volume solids. This has been corrected.

Model build

- **Case 18004**

When using 'model build from CSV' on a windows PC, if you have 'relative paths' set as your output option, and the 2 files referenced by your CSV file are on different drives, you will get an error message stating PRIMER cannot have relative references across drives, but the model build process will continue leading to a output file containing errors. This has been modified so the model build process is killed correctly.

Model modified

- **Case 18066**

Using the Compare Geometry function on models where the sections were undefined (zero) on the part cards could crash PRIMER. This is now fixed.

- **Case 18056**

If parts were moved between assemblies, the Model Modified tree could become confused about which parts had been modified and which message associates with a part. In PRIMER 10.1 the 'what's modified?' function does not support modification of part tree assemblies so the routine that caused the problem has been excised. This will (hopefully) be supported in future versions of PRIMER.

- **Case 17879**

Model modified would occasionally fail to find a modified title. Now fixed.

- **Case 17849**

When doing a model modified in models where items have been moved from one include to another, if the include file name exceeded 56 characters in length PRIMER could crash on some platforms. This is now fixed.

- **Case 17848**

The control over comment comparison for model modified has been improved to meet user requirements. Two new prefs exist
- check_for_modified_header_comments
- check_for_modified_kw_comments
By default both are ON. Setting the former to OFF will mean that model modified

ignores the comments at the top of include (or master) file, setting the latter OFF will mean that comments associated with keywords will be ignored.

- **Case 17801**

The switch 'calculate part masses' on model modified may be switched off to speed up the process.

This worked in itself, but when the drop-down was subsequently used from the 'what's modified?' tree to set up the part compare table for selected parts, the mass columns could appear. This has been fixed so these columns are suppressed.

- **Case 17538**

For unlabelled items, detecting whether an item has been deleted/created or moved from one include to another is problematic.

When a model is changed by moving an unlabelled item (for example a *CONSTRAINED_EXTRA_NODE) from one include to another, the include modified function may not 'red light' the include from which the item has been moved as changed.

For PRIMER 10.0, the workaround (only necessary if you have been manipulating unlabelled items) is to use the function COMPARE INCLUDE available when you access FIND MODIFIED off the model dropdown on the include tree. For PRIMER 10.1, the logic has been corrected.

- **Case 17510**

For unlabelled types, the model modified function had lost some logic which reports change of sub-option on a keyword. For example the change from *CONSTRAINED_EXTRA_NODE to *CONSTRAINED_EXTRA_NODE_SET when the node set id is identical to the node id could go undetected as the contents of the card are ostensibly unchanged. This has been fixed.

- **Case 17335**

When applying the Copy M2->M1 function on the model modified tree, the removal of the copied items (as they are no longer different) from the tree could cause the detail difference messages to become confused as the association between item and message was broken. The function has been changed so that the items are not now removed from the tree. It is the user's responsibility to apply the 'refresh tree' button.

Nastran

- **Case 18080**

Previously, PRIMER could only read PCOMP layer data if it was in the format of 2 layers specified per line, whereas it can also be defined as 1 layer per line. This has been corrected. Also, it is now not required to specify MID and thickness for each layer, only the beta angle (as the last MID and thickness set will be used) – this is also allowed in Nastran.

- **Case 17865**

Command line input of Nastran models was set up incorrectly in previous PRIMER versions. This has now been fixed.

Node transform

- **Case 17835**

PRIMER could crash when creating a node transform. Now fixed. Additionally Sketch did not work for node transforms. It now does.

Parameter

- **Case 17783**

When editing *PARAMETER_EXPRESSION definitions PRIMER gives the required number of rows of text input boxes in which the expression can be entered and modified.

These used the same font (type face) as the rest of the user interface, but if the default proportional fonts were used (typically Arial on Windows) then the symbols used for some mathematical expressions were so small that they were hard to read. In particular '*' was difficult to distinguish, and often appeared more like '^'.

Therefore the type face used in these buttons has been changed to a fixed width font, typically Courier, which gives slightly more easily read symbols. The text entry buttons have also been widened to try to prevent the expression overflowing their boundaries.

- **Case 17708**

When using parameterised data fields on any of the 4 optional cards at the end of a *CONTACT definition it would be possible for PRIMER to 'lose' the parameter.

This would happen if:

- All fields on the optional card (and any following cards) were zero
- The value of the parameter used was also zero.

The reason was that PRIMER checked for any non-zero values on those cards, and only wrote them out of one or more were found. However it did not also check for a parameter being used. So if a parameter with a value of zero was used, and no other fields were non-zero, then the card(s) were still omitted leading to the 'loss' of the parameter.

This has been fixed by adding a test for any parameter usage on an optional card, regardless of its value, and writing it out if any are found.

- **Case 17294**

Using a parameter to define the label of *SET_xxx_COLLECT caused internal confusion in PRIMER, with the result that the parameterisation of the label field on the set was lost. This has now been corrected.

Part table

- **Case 17924**

On part table and quick pick information, the element formulation was not being correctly reported for parts of type thick shell. This has been corrected.

- **Case 17497**

If a model is read with a latent part card (of type other than shell), attempting to fix the section definition on the part table will introduce an error which may crash PRIMER when the section card is subsequently accessed, e.g. for editing or checking. This will not happen if the latent part is of type shell.

Pedestrian

- **Case 17800**

The option to 'Draw the process to screen' in the pedestrian mark-up script could display the wrong lines in certain circumstances. This has been fixed in v10.1.

- **Case 17542**

The pedestrian mark-up script (in OA_INSTALL/primer_library/scripts) created duplicate head impact points along the centre line of the bonnet for the GTR protocol. This has been fixed in v10.1.

- **Case 16485**

The head zone division lines created by the pedestrian mark-up script could sometimes mark parts that were not on the outer surface of the vehicle, leading to zig-zag lines. This should no longer happen in v10.1.

Penetrations

- **Case 17060**

The contact checker in PRIMER 10.0 did not always choose the correct tied segment in the case where due to very thick segments it is ambiguous to which segment the node ties. The logic has been improved.

- **Case 14927**

When plotting contour check penetrations and/or crossed edges it is possible to turn on 'as thick' display of shell elements, showing the actual thickness used for contact.

Since facets containing crossed edges are rendered in grey, and the 'as thick' lines were also grey, it was sometimes hard to tell lines apart on the screen.

Grey was used because 'as thick' can be combined with contour plotting of displacements, meaning that all colours would normally be in use, however it was unreasonable to fix this as the only choice of colour. Therefore 'as thick' lines are now rendered in the current overlay colour, and while this defaults to grey (so plots will be unchanged by default) the user can now choose any colour they wish.

Quick pick

- **Case 17697**

In Quick Pick mode it is possible to operate by types 'Include file' and 'Part tree assembly'. These were giving error messages if used to change colour, transparency or display mode.

This has been fixed, and these combinations of selection method and operation now work correctly.

Read

- **Case 18031**

When using Model->database PRIMER could not read models on Linux/UNIX from a database that was created on windows with relative paths. This has been corrected.

- **Case 17649**

PRIMER could crash when reading Abaqus files containing sets of an element type PRIMER does not support. Fixed now.

- **Case 17560**

The file read log did not work when scanning a model. It now does.

- **Case 17555**

Skip file data may legitimately contain blank lines. The option to re-insert the skip data was wrongly culling these lines. This is fixed.

- **Case 17546**

Models with include files which contained unrecognized keywords in the main file were failing to write the 'skipped data' file correctly for these keywords. The problem did not arise if said keywords were in include files. This has been fixed.

- **Case 17505**

If a Windows shortcut file was selected then PRIMER would try and read the contents of the shortcut file not the file that was the target of the shortcut. Version 10.1 has been changed so that all files selected using the file browser are now checked to see if they are a shortcut and if they are then the target of the shortcut is returned instead of the shortcut.

Rigidify

- **Case 17880**

Rigidify could incorrectly flag force transducer type contacts for deletion. This has been corrected.

- **Case 17842**

During LS-DYNA method seatsquash, you could end up with extra node entities in the seat/dummy removed during the rigidify process which would result in nodes on entities (for example nodes on an accelerometer) which were no longer on a rigid body. This has been corrected.

- **Case 17733**

The rigidify function removes superfluous constraints so that the model will initialize in LS-DYNA. Constrained type RIVET was, however, being ignored. These are now treated.

- **Case 17606**

When using the 'simplify and delete' mode of rigidify, PRIMER could give an error message about running out of flagging bits. This has been corrected.

Scripting

- **Case 17890**

If the KeywordCards() method from JavaScript was used on an item that had parameters PRIMER crashed.

This has been fixed.

- **Case 17851**

The functions for outputting keyword data in JavaScript for the Transformation class would not write the transformation types correctly. They would be written as a numerical code (1, 2, 3 etc.) rather than the string type (TRANSL, ROTATE, etc.) This has been corrected.

- **Case 17552**

The function File.DriveMapFilename() did not convert directory separators from \ to / (or / to \) when doing the mapping. Now fixed.

- **Case 17544**

The optional title argument for Hourglass constructor did not work. Now fixed.

- **Case 17541**

Setting model control card properties did not work in JavaScript. Now fixed.

- **Case 17295**

The Widget selectedItem property did not return the WidgetItem. Now fixed.

Seatsquash

- **Case 17818**

When using PRIMER method seatsquash with the 'no solids' option, PRIMER could create INITAL_FOAM_REFERENCE_GEOMERTY cards automatically by error. This has been corrected.

Segments

- **Case 17860**

When creating segments in coat part or in the set editor PRIMER could leave cross references to nonexistent segments. Now fixed.

Selection

- **Case 18062**

When screen picking any item PRIMER might fail to select things that were plainly visible if:

- There were 2 or more models in the database
and
- The pick point was towards an edge of the screen.

This has been fixed.

- **Case 18028**

When screen-picking by Model or Part, PRIMER could sometimes fail to select what would (to a human) be the obvious item.

This was because it would perform an initial search for the item nearest the pick point, ignoring hidden surface removal, and then consider what element might exist at the pick point. Sometimes the nearest node (used to pick a model) might be obscured by the overlying element, resulting in a failure to select.

The picking routines now look in more detail at any overlying element, and will infer a selection from that if possible. This should improve the accuracy of picking.

- **Case 17934**

A crash could occur if:

- For any object type the user started something implying pick of a single item. (For example Keyword > Modify)

- In the resulting object menu they selected [Vis] and subsequently [Screen_area].

- They dragged out an area that did not contain any of the requested item type.

This has been corrected, and such a selection will now be ignored.

Note: in one sense it is illogical to permit an area pick for a single item, but this is retained as a special case since the user may be looking for a single item they know is somewhere within an area but is obscured by other graphics.

- **Case 17839**

PRIMER could crash if selecting nodes to fix in the contact penetration panel with the 'feature line' VIS feature on. This has been corrected.

- **Case 17757**

When screen-picking contacts PRIMER could sometimes decide for itself that a particular contact was unambiguously the 'nearest' when in fact two or more contacts used the same set, part, element or node that was actually screen-picked. If the ambiguous menu was active it should instead have mapped that to give all possible alternatives.

This bug was raised for contacts, but it would apply equally to sets or any other category where the same underlying pickable node or element might be present in more than one candidate.

- **Case 17603**

Selection in the rigidify panel could cause a crash.

This was due to a special set of circumstances in which the rigidify operation implied deletion of some items, and these had been selected visually by the user.

This has been fixed.

Sets

- **Case 17478**

PRIMER was wrongly outputting a _COLLECT set with the header *SET_type_LIST_COLLECT, but it seems that LS-DYNA treats this as a plain _LIST set, ignoring the _COLLECT suffix.

The user manual is unclear about whether this combination of keywords is valid, but in the meantime if a set is a _COLLECT one then PRIMER will no longer add _LIST as a sub-keyword.

Shortcut

- **Case 17540**

If ZOOM IN/OUT was assigned to one of the function keys (F1,F2 etc) then the zoom would not be centred correctly on the current cursor location. If a normal key was used then the zoom would use the cursor location.

This has been fixed.

Sketch

- **Case 17787**

Sketching could be very slow on Windows platforms if the centre of the item being sketched was off the screen.

This has been fixed.

Text

- **Case 17963**

Using 'Text edit' on a *SECTION card could result in the section definition being corrupted if the user accidentally types in a comment line without the '$' in column 1.

Normally text in row 1 / column 1 would be invalid input which PRIMER would reject, so the read of the edited definition would fail.

However for *SECTION (and also *MAT, *EOS, *TMAT and *HOURGLASS) it is possible to use character rather than numeric labels, so text in column 1 / row 1 is valid input.

There was an error in the import of as-edited data following text edit that would result in character labels for these keywords being corrupted. This meant that editing of keywords using genuine character labels, or accidental insertion of character data, would both result in the definition in the database being corrupted.

This has now been fixed.

Translators

- **Case 17524**

The Abaqus reader now supports keywords in lowercase as well as uppercase.

User interface

- **Case 17515**

On HP-UX, and possibly other Unix platforms running an X11 window manager, using the 'View Log' button to invoke an editor session to examine the input log could cause PRIMER to lock up when the edit session was terminated.

This wouldn't always happen, but when it did there would be messages reporting synchronisation errors from the X11 server. These were because the editor session and the PRIMER one were trying to write to the same window in an unsynchronised fashion.

A workaround in PRIMER 10.0 is to define a 'timeouts' file, in the OA_ADMIN or OA_INSTALL directories, containing a row for PRIMER with an initial timeout set to a very large value to make it ineffective. This will cause the X11 session to be initialised in a way that will prevent this problem occurring.

The problem has been fixed in V10.1 onwards.

Write

- **Case 17479**

On Windows 7 machines the file selection box could occasionally give an error message 'file name is not valid' for some filenames. Now fixed.

Ztf

- **Case 17707**

If a model used RPBHX=8 on the *CONTROL_SPOTWELD card to convert MAT100 spotweld beams into 8 hexa nuggets by LS-DYNA, PRIMER could crash when writing a ztf file. This has been fixed.

2.1.2 Bugs Fixed in PRIMER 10.0

Adhesive

- **Case 16321**

The adhesive path split function did not work correctly. The path itself was correctly split, but the resulting solid elements could reference the wrong nodes. Fixed now.

Airbag

- **Case 16918**

When creating a new airbag, if you created a new item (such as a part or part set) from a popup on the airbag edit panel, the airbag edit panel was not updated correctly with the newly created item. This has been corrected.

- **Case 15106**

The yellow row numbers on the airbag edit panel were not updated when using the panel slider. This has been corrected.

- **Case 15040**

- Merging node which was used in an *AIRBAG_SHELL_REFERENCE_GEOMETRY corrupted the entry in the reference geometry. Now fixed.

- Editing a node which had *AIRBAG_REFERENCE_GEOMETRY defined for it would lose the reference geometry. Now fixed

Airbag folding

- **Case 15124**

When reading origami data Primer would give an error if the factor for a scale fold was < 0. This is now valid (since 9.4) and so the error message has been removed.

- **Case 14256**

Quick pick did not work for parts after converting a mesh-independent origami into a 'normal' origami. Now fixed.

Assembly

- **Case 16272**

A model build from csv file operation can now be terminated using Primer's 'Stop' button. This will complete the current Assembly but will not consider subsequent target points.

- **Case 15865**

The function 'create build database from model includes' was intended to be applied to as read models. If the function was applied to models which have been created in Primer and not yet saved it could crash the program. This has been fixed.

- **Case 15470**

Model build in command line mode was found to sometimes cleanup sets which have no cross-references. This is not necessary, these sets (which may be deliberately being kept) will not now be deleted.

- **Case 15335**

Model build would not accept the following names as valid character strings - e,E,d,D and e1,E1,d1,D1,e2,etc.

Now Primer treats any string where the first digit is not a number as a valid character string.

Note that for floating point numbers the formats 1e2 and 1d2 are (as before) acceptable.

- **Case 15238**

When reading in a model containing include files where different include files have HM comments referencing the same assembly, Primer would create multiple assemblies with the same name. This has been corrected.

- **Case 14663**

Warnings about undefined parameters are no longer issued during command line automated model build using the PEDLEG_UPPER type.

- **Case 13192**

Automated positioning which uses the contact penetration algorithm, has been sped up by a factor of approximately 2 by improving how the contact data is set up. This will be particularly noticeable with large models.

Attached

- **Case 16750**

If something had been sketched, and then the image redrawn to remove the sketched item, then PRIMER might wrongly 'remember' that the sketched item had been visible.

This mattered in 'Find attached' which relies on knowing what is and is not

visible, with the result that it might 'grow' structure from things that are not visible.

It might have odd effects in other situations where visibility status was used, for example screen-picking might select something no longer actually visible.

This has been corrected, and removing a sketched item will now update the visibility tables as required.

- **Case 16626**

Find attached did not work through deformable to rigid. This has been corrected.

- **Case 16161**

Find attached did not find a rigid part attached to a CONSTRAINED_RIGID_BODY_MERGE when the 'Single elems' switch was active for rigid bodies. It does now.

Belts

- **Case 17027**

Seatbelt Auto-refit in the default 'reuse existing labels' mode deletes and then regenerates the nodes and elements that make up the seatbelt, and in the process it has to check whether the entities that are about to be made will clash with any existing ones in that label range. If such a clash is detected the existing items are renumbered to move them out of the way, so that the belt label ranges are contiguous.

This logic worked, but the new labels given to renumbered items were the highest in the model + 1 onwards, and in a model where labels are organised by include file this can have the effect of moving the item labels out of the permitted range of a given file.

Therefore the relabelling logic has been modified so that when existing items are moved this is by the smallest possible label increment, which almost always means that they remain in the same include file label range.

- **Case 17000**

Primer could get stuck in a processing loop if clicking on the main 'Explain' button on the seatbelt refitting panel. This has been corrected.

- **Case 16876**

Problems arose with seat-belt auto refitting when the following sequence of events took place.

- The user kept his dummy and structure definition in keyword file A.
- He kept his Primer *BELT definition in keyword file B.
- He modified file A to move the dummy without also reading file B into that Primer session.

This meant that the logic inside PRIMER which would keep track of changes to belt path points did not 'know' about the changes to the dummy location, and hence got confused when it came to belt refitting.

To account for this situation the logic which reads in Primer *BELT definitions will now consider whether a node is defined for each belt path point, and if there is will update the point's (x,y,z) coordinates to become that of the node, overriding any coordinates stipulated in the file.

- **Case 16747**

When a model contains 2D seatbelt elements PRIMER includes the mass of their part(s) in its normal summary table.

However it was calculating the wrong value, because it was treating the first field of the *MAT_SEATBELT card as density rather than mass per unit length.

This has now been corrected. This mass per unit length is now smeared across the elements that make up the seatbelt to arrive at a correct overall mass.

(Note that this requires that the 2D seatbelt elements have been meshed consistently from quads as required by LS-DYNA, and that EDGSET on the relevant *SECTION_SHELL card has been defined correctly as a node set spanning one end of the belt. Failure to meet these two requirements will result in no mass being calculated for the belt elements.)

- **Case 16560**

Error check for retractor 'fed length less than 3*min length of mouth element' was incorrect. It was applied to elements internal to the retractor, but it should have been applied to the external mouth element. This has been corrected.

- **Case 16061**

When a sub-section of an existing 1d and/or shell seatbelt definition was selected manually for refitting, PRIMER would offer to 'reuse' any existing sliprings, but this process did not work correctly.

Depending on the options taken the slipring might be reused, but the belt would not be continuous through it (no common node on belt ends), alternatively if the existing definition was ignored a duplicate slipring would be created.

The 'reuse' process has been improved in this situation so that when only a belt on one side of an existing slipring is remeshed, then the new belt elements on that side will be joined at the existing common topology node with the existing elements on the other side.

- **Case 15991**

Primer could get stuck in a slow loop if fitting a belt over existing sliprings/retractors where the labelling of the existing sliprings/retractors was non sequential and contained large gaps. This has been corrected.

- **Case 15631**

A user experienced problems during belt fitting when he tried to model a simple platen with a belt passing over it and then through a slipring to a fixed point.

Problems arose both because of the reverse curvature of the path, which

necessitated the slipring, and because Primer treated the straight section between slipring and fixed end as meaning that the slipring was a 'shoulder' one and hence subject to special rules.

Rather than add further controls to what is already a complicated panel the user manual has been updated to explain why the problem arose, and how to fix it by adding an extra point which alters slipring behaviour.

- **Case 15462**

Primer could crash when using the 'Create all' button on the Seatbelt contact creation panel if you only had 1D elements in your seatbelt definition. This has been corrected.

- **Case 15079**

When the user created a new BELT (fitting) definition, and at least one already existed, then the new definition did not automatically become the current one, which would be the expected default behaviour.

This has been corrected, and when a new BELT definition is created it now automatically becomes the current one for fitting.

Checking

- **Case 16741**

Primer no longer gives a node error on model check if two nodal rigid bodies overlap, as LS-Dyna now has the capability to merge them.

- **Case 16720**

Primer could give incorrect NODE error messages about *LOAD_THERMAL cards if the node is referenced by *INITIAL_TEMPERATURE_NODE. This has been corrected.

- **Case 16705**

Use of the listing function on category drop-down of the main model check panel could result in an incomplete listing of errors/warnings and an incorrect total being reported on the panel. Running re-check off the same drop-down would always restore the correct total. This was most likely to affect contact, constrained and connection categories.

- **Case 16640**

Primer could give incorrect error messages in the dialogue box when checking individual contacts that contained empty parts in the slave/master part sets. This has been corrected.

- **Case 16612**

A new check for *DATABASE_CROSS_SECTION_SET has been added to ensure that each element in HSID, BSID etc. has at least one node in the node set NSID.

- **Case 16448**

Error check for *RAIL_TRAIN card is modified to correctly print the message for *RAIL_TRACK card, if it is not defined but referenced.

- **Case 16419**

Error checks involving models with *LOAD_HEAT_GENERATION cards would cause Primer to crash under certain circumstances. This issue has been fixed.

- **Case 16339**

Model checking with penetration checking active terminated if an empty contact was encountered because this caused the penetration checker to return an error code. This applied even if the contact can legitimately be empty (e.g.FORCE_TRANSDUCER).

In Primer10 an empty contact will simply be reported as an error (if appropriate) and will not terminate model checking.

See also case 15338.

- **Case 16018**

*LOAD_REMOVE_PART now works with beam elements so the check for a valid part type has been updated.

- **Case 15718**

A spurious error report about wrong element type in part composite which uses *ELEMENT_BEAM_PID has been fixed.

- **Case 15702**

Checking CTRL on the edit control panel was always using the actual values for checks on model timestep and added mass. It has been corrected to use the scratch (edit) value.

- **Case 15432**

When checking sliprings and retractors for 2D seatbelts Primer used a tolerance of 1e-4 of the diagonal of the attached elements as the permitted separation distance between nodes in the node set and nodes on the belt (which are supposed to be coincident).

It turns out that LS-DYNA uses a tighter tolerance, so two changes have been made:

(1) The checking tolerance has been tighted to 1e-5 of the diagonal of attached shell elements on the belt.

(2) An 'autofix' function has been added which will move the belt nodes so that they lie exactly on the coordinates of the nodes in the relevant node set.

The autofix option is only made available if the error in node coincidence is 'small' (defined as < 10% of the shell diagonal), the intention being that it should

only be used to correct small tolerance errors, because larger errors will probably be due to discrepancies in the model.

The autofix function also applies to 1D retractors and seatbelts.

- **Case 15338**

A new warning has been added for the case where the id of a *NODAL_RIGID_BODY is also used by a structural part. This ambiguity is a potential source of error. The d3hsp file issues a warning, irrespective of whether the part is rigid or not.

Additionally, the routine which automatically generates a label for the NRB creation panel has been modified so as not to offer labels which are being used by structural parts.

- **Case 15328**

When model checking encountered an ill conditioned connection contact definition (where there were no entities on slave or master side), the model check process was being aborted and spurious reports of memory allocation failure were being issued.

The case of an empty contact is now treated correctly and will no longer cause model checking to abort.

- **Case 14719**

When a rigid part has a *BOUNDARY_PRESCRIBED_MOTION defined with velocity specified at t=0, Primer reports a warning if there is no *INITIAL_VELOCITY_RIGID card defined for the part. It is, however, legitimate to define the nodal velocities directly for rigid parts (for example by INITIAL_VELOCITY). Primer has been corrected to check for definitions which apply to all nodes of the part.

- **Case 14669**

Primer now issues an error message if a part made of *MAT_GAS_MIXTURE or *MAT_ALE_GAS_MIXTURE does not have a corresponding *INITIAL_GAS_MIXTURE card.

The error message reporting zero mass densities for the above two materials is no longer displayed in Primer as the mass densities are defined on the *INITIAL_GAS_MIXTURE card.

- **Case 4006**

An error message is given when mass is applied on an non-structural node or a node set having non-structural node.

Clipboard

- **Case 16296**

If all the layer parts of a connection are on the clipboard when a 'find referenced items' operation is carried out the connections and their contents are also flagged,

however the part used by the connection FE contents was not. This has been corrected.

- **Case 16234**

Items that are referenced but not defined (also called latent items) can no longer be added to the clipboard.

Command files

- **Case 16961**

It is now possible to input filenames with spaces in the dialogue box commands by enclosing them in quotes.

Comments

- **Case 15833**

There are various places in Primer where a system text editor may be launched, for example when editing comments at the top of the deck. Two problems have arisen with this:

On Unix and Linux, in 64 bit mode only, there could be a conflict between the security routines and the process used to launch the editor, the result of which would be that the editor session would run normally, but when it was terminated a second (and possibly even a third) editor session on the same file might start.

On Windows an edit session might fail to start if the filename to be edited was shorter than the filename of the editor executable itself. This would be a rare occurrence since temporary filenames tend to have long pathnames, whereas executables tend to be shorter, but it could occur.

Both problems have now been fixed.

Connections

- **Case 17183**

It was possible to get mis-shaped solid spotweld connections when creating spotwelds at a point on a panel where a shell web was meshed into the panel. This has been corrected.

- **Case 16751**

Creation of 2pt patch revolute joint 'bolt' did not work if the hinge to be bolted consisted of 4 holes. This has now been fixed.

- **Case 16736**

On large models with many 1000s of connections sorting the connection table can be very slow. This is because a very simple sorting algorithm is used.

For categories <type> <subtype> <status> <error> the sort is now applied to the underlying integer rather than the information string itself which has given a speedup of about 4x making the performance acceptable (for now) on a fast

machine. If model sizes continue to grow, a more sophisticated sorting algorithm will have to be devised.

- **Case 16710**

When beam welds are displayed on the table, Primer shows the correct diameter (derived from the section of the beam). However, when the connection type for selected beams was changed to solid, the diameter was lost (being set to the default value). The logic has been corrected to retain the beam diameter as the initial value for the solid weld. The user may, of course, change this value using the dropdown.

- **Case 16495**

If changing the label of a part on the part keyword editor, any applicable connection layer information is also updated.

- **Case 16398**

Primer no longer treats solid spotwelds tied to a shell part with *CONTACT_TIED_SHELL_EDGE_TO_SURFACE as an error, although *CONTACT_TIED_NODES_TO_SURFACE is preferred.

- **Case 15844**

When creating connections, sometimes the labels of the FE entities created may not re-use labels used in previously deleted connections. This has been fixed.

- **Case 15752**

When reading a custom weld file there is the option to ignore part data, which should enable welds to be made even when no part information is provided. This ability (lost in 94) has been restored. For spotweld beams the layer data for the connection will be constructed from the shells to which the beam attaches.

- **Case 15706**

If beams on a connection entity have their ELEMENT_BEAM_PID's in the incorrect order a warning message is given. If the user manually tried to fix this through the ELEMENT_BEAM edit panel, the connection definition could be incorrectly modified as a result. This has been corrected.

- **Case 15592**

When Primer creates connections for existing MAT100 welds in a model in which the spotweld contacts already exist, the contact checker is used to ensure that the tied part is used in the layer definition (not a part that may happen to be coincident with it).

If however, a spotweld attaches to duplicated shell, the choice of candidate shell is ambiguous in LS-Dyna and may not be the shell of the part actually in the contact! To be conservative, Primer will select the thinnest as candidate.

For the case of making layer definitions, the action of the contact checker has been modified so that the shell of the part actually defined in the contact is always used.

The contact connectivity check will always run the standard contact checking procedure, so the spotweld node needs to be within the zone of the thinnest shell in the duplicate case (irrespective of which part is in contact) to be reported as tied.

Contacts

- **Case 17059**

For CONTACT_SURFACE_TO_SURFACE_TIEBREAK and fields could not be inputted correctly when the field was set to 9 or 11. This has been corrected.

- **Case 16499**

Primer could not read *CONTACT_FORCE_TRANSDUCER_CONSTRAINT, it could read/write the card however with _CONSTRAINED on the end. Dyna reads both and treats them the same. Primer will now also read both, but will write them out as _CONSTRAINT.

- **Case 15989**

Contact penetration checking in Primer release 9.4 was threaded (ie parallelised) in order to make it run faster.

We have encountered problems with the checker 'Locking up' on some low performance machines, and this has been traced to thread synchronisation problems.

A workaround in Primer release 9.4 is to set the environment variable PRIMER_NUM_THREADS to 1, which turns off threading.

In Primer release 10 threading has been extended to more functions, and a more reliable synchronisation scheme adopted which should fix this 'lock up' problem during contact checking.

- **Case 14751**

When editing the optional data for contacts and pressing '=> main panel' the panel stayed at the larger size with blank space rather than resizing back to the correct size again.
Now fixed.

- **Case 10898**

The contact checker has been corrected to handle tied contact between segment sets.

Contour

- **Case 16302**

The contour value calculation has been improved for Beam and Discrete elements to show the correct values while plotting the contours for initial velocity. This improved algorithm excludes latent nodes (if any are used for the Beam or Discrete element definition) from the calculation.

Control

- **Case 16527**

Writing out *CONTROL_MPP_DECOMPOSITION_TRANSFORMATION keyword is corrected.

Cut section

- **Case 16957**

Saving a cut-section definition to file works, but attempting to retrieve it was failing. Retrieval would work if the PRIMER session were shut down and restarted. This is now fixed.

- **Case 15161**

When a cut-section was drawn through a small model that was very distant from the origin its visual appearance was 'blotchy' with gaps between solid elements, and also the response of section dragging to mouse movement was jerky.

All these problems share the same cause which is ill-conditioning. Nodal coordinates are stored in 32 bit single precision, which gives a maximum resolution of about 3 parts in 1e8.

The model in question had coordinates of about 5e5 units from the origin, but the model itself was small: about 2 units across. Therefore dragging the section by one pixel with the mouse on a display of ~ 1000 pixels resolution would give a change in coordinate of about 2e-3 which, when added to a nodal coordinate of 5e5, would get 'lost' at single precision.

This resulted in dragging 'freezing' or being jerky, since it was necessary to move the mouse several pixels in order to see any change in the section.

The 'blotchy' appearance of the elements arose from the same 'difference between two large numbers' problem. The interpolated coordinates where the section cut the elements was being calculated correctly, but the single precision floats used for the graphics were unable to resolve this accurately enough, resulting in step changes of coordinate and hence gaps between elements.

The jerkiness and freezing in response to mouse movement has been fixed, but the overall resolution problem has not been because even if calculations are performed in double precision it is still necessary to convert the end result to single precision in order to send it to the graphics card.

So this bug has been marked as fixed, but that is only true in part because of the limitations of the hardware, and the solution is to avoid the problem of a small model very distant from the origin. For example when ORIENT was used to move the centre of this model to (0,0,0) then cut-sections worked very smoothly, and this may be the only response if the problem arises again and good images are required.

Database

- **Case 16177**

If you changed the node ID on an _ID type DATABASE_HISTORY entity, any title was removed. This has been corrected.

Deleting

- **Case 16477**

Primer will now identify sets that would be empty after a model cleanup, and these are also flagged for deletion during a cleanup. Previously this would require a second 'cleanup unused'.

- **Case 16014**

Deletion of *INITIAL_STRESS_SECTION and *INITIAL_AXIAL_FORCE_BEAM cards will no longer result in the deletion of other referenced entities.

- **Case 15450**

If a new fold was created in the airbag folder that used a new node/shell set then clean up unused would think that the set was eligible for deletion. Now fixed.

- **Case 15414**

Operations (such as shell deletion) which require initialization of connection data were reported to be very slow on some models. The problem only occurred in models with MAT100 welds created by programs other than Primer.

The problem is repetition of the phase that tries to generate connections from welds which do not have them. If this process is successful for all welds, it will be done only once per model and so is not a problem.

However, models that contain cluster spotwelds or welds where the topology is poorly conditioned (n1-n4 not on same layer) will not generate connections for all welds.

The problem has been addressed on two fronts.
- poorly conditioned solid topology for non-cluster welds can now be fixed in primer (see case 15484)
- unless the user actually presses 'connections' tool, Primer will only attempt to generate a connection once per weld. Thus 2nd and subsequent shell delete operations in a model with cluster welds will not incur an attempt to generate connections.

- **Case 15404**

The option for CONX_ACTION which can be set on the remove panel will now apply as a global option for all deletion operations. Further, if the option is set to 'no action', Primer will now correctly delete shells without any action in respect of connections.

Dummies

- **Case 16775**

When reading and copying a model containing a dummy problems could arise when the *DUMMY_END card was processed if any of the *SET definitions referred to in the dummy are in an include file that is read after that containing the dummy.

This is because the 'end of dummy definition' processing performed various checks and assignations immediately, and these might fail if some data had not been read in.

The problem is largely theoretical because we have never encountered the situation where the 'tree' file for a dummy is in one include file, and its structure is in another, but it has been picked up in testing.

The problem has been solved by deferring the 'end of dummy' calculations until after the whole model has been read in / copied.

Elements

- **Case 16263**

Primer would not read the second line of a *ELEMENT_SEATBELT_SLIPRING card if ONID was zero. This is as per the LS-Dyna manual, however, Dyna will read the second line if ONID is zero and the fifth field of the second line is blank. Primer reading has been modified to match.

- **Case 15981**

In previous versions, the ELEMENT_BEAM editing panel would, by default, install options such as _OFFSET that might have been used in previous 'Create' instances. This is no longer done.

- **Case 15223**

Primer would previously report incorrect internal angles for concave quad shells in certain contexts. This has been fixed.

- **Case 15146**

When creating a shell element the topology could be altered incorrectly if the element shape was excessively distorted. Now fixed.

- **Case 15030**

Primer will now allow N2 to be -ve N1 for discrete *ELEMENT_BEAMs.

Formfx

- **Case 16942**

Various problems arose with the 'Forming' option, in which results from a source model are mapped onto a target one:

(1) It was unacceptably slow.

(2) Although there was a '%age complete' feedback, it didn't seem to relate to actual progress.

(3) It was impossible for the user to break out using the STOP button.

The algorithm that searches for an element on the source model to match that on the target was using a 'brute force' approach, meaning that search times rose as the product of <#elements in source model> times <#elements in target model>.

This has been improved and parallelised, and searches which previously took hours should now complete in minutes - or even seconds if the two models overlay one another closely.

The feedback of progress has been improved. It now reports which phase is current, gives a %age completion which reflects accurately the actual progress made, and also reports how many elements in the target model actually found a match on the source one.

The limiting search distance, previously a hard-wired and invisible value, is now user-configurable; it also uses a more sensible value as a default.

The 'STOP' button is now active during the slow search phase, so that the user can abort if he gets bored!

General

- **Case 15866**

When '-batch' was defined on the command line it was possible for a checkpoint (cp_...) file to be left behind.

This is now deleted.

Graphics

- **Case 17204**

If you had a white graphics background and black text then the graticule and its values could disappear if you turned off the triad.

This was because the correct colours were not being set correctly, and has now been fixed.

- **Case 17196**

When plotting the material axes for a material using a -ve AOPT, i.e. referencing a DEFINE_COORDINATE_SYSTEM, and the coordinate system used the _NODES option and explicitly specified the DIR field to be X, Y or Z in the input deck, then the direction of the material axes could be displayed incorrectly. This has been corrected.

- **Case 16863**

The 'daisy chain' popup menus offer UNBLANK and ONLY as options for things which are drawable, and these have the effect of unblanking the item in question (and blanking everything else in the ONLY case).

In order to make sure that the item is drawn its 'entity visibility' switch is also turned on, and while this logic was working correctly it was giving unwanted results in the case of *SET definitions.

The outcome was to mark the *SET_type as drawable, and to draw the set. However in the case of SET_PART and SET_element_type this was a rather unfriendly approach since while all elements would be drawn this would be in the colour of the parent set, rather than in their 'native' colours. In other words the effect was 'unblank set', not the expected 'unblank contents of set'.

This has been modified so that for SET_PART and SET_element_type the effect is now 'unblank set contents', so the entity visibility switch of the underlying element type is turned on, and the elements are drawn in their normal colours.

Note that the original logic remains for 'non element' sets, notably SET_NODE and SET_SEGMENT, both of which will still be drawn 'as sets' in this context.

- **Case 16719**

Graphics of a large model containing many nodal rigid bodies was slow, particularly in its response to dynamic viewing.

This was because the *SET_NODE definitions used to define the NRBs used SET_GENERAL, and the process of spooling through these to draw their contents was taking a long time.

The contents of these set types are now cached by Primer, not just for graphics but for all operations, and this means that after an initial delay when building the cache the response to dynamic viewing is now acceptably fast.

- **Case 16700**

Repeated blanking/unblanking of different include files in the blanking menu could lead to unexpected results (things unblanked that were selected in previous operations). This could also apply to other items (such as assemblies and materials). This has been corrected.

- **Case 16689**

*DEFINE_BOX suffered from two graphics-related deficiencies in Primer:

(1) A Box could not be screen-picked in any way.

This has been fixed, and boxes may now be selected from the screen in all relevant contexts.

(2) Orientation of a box uses special logic for rotations to stop it 'collapsing in' on itself because of the way it is defined by two opposite corners: simply rotating the min/max coordinates results in a zero thickness box at 45 degrees rotation.

For Orient rotate Primer expands a box to a true 3D shape, defined by 8 vertices, and rotates these vertices. When the orient operation is complete PRIMER calculates the orthogonal bounding box around the updated vertex coordinates,

and uses the max/min of this as the new box definition.

However this means that during an Orient 'drag' operation the conventional min/max coordinates of the box are not updated in a standard way, resulting in no apparent movement of the box despite its being dragged. In fact drawing of a box was suppressed altogether in this context to stop the wrong position and shape being drawn.

This has now been fixed as follows:

+ Graphics of boxes during ORIENT is now based on their 'expanded to 8 true vertices' coordinates, showing the correct modified orientation and position.

+ Dragging of box graphics is now also enabled, also showing the true orientation and position.

+ At completion of each Orient Drag operation the graphics of the true 3D box shape, possibly rotated away from orthogonal X,Y,Z global axes, is replaced by the bounding box that PRIMER will ultimately use when the Orient is 'accepted'.

So to summarise: Orient Drag will show the 3D shape and orientation that would be used were it possible to define boxes in an arbitrary 3D orientation, and at the end of each drag the resulting orthogonal bounding box that Primer will use is then displayed.

However this results in a discrepancy between the current min/max coordinates and the actual coordinates that will be used when the box is finally updated at the end of the ORIENT.

- **Case 16332**

In the BLANK menu mixing the use of the 'All' buttons (Model, contacts, etc) with explicit selection in the object menu could result in things being blanked or unblanked despite not being selected. In some cases it might result in a negative number of items being (supposedly) reported as selected for blanking!

This could be worked around by restarting selection in the object menu.

The problem has now been fixed.

- **Case 16247**

Historically PRIMER has always defaulted to colouring part-based items by part, other labelled items by label sequence, and non-labelled items by fixed colours. It also offers 'Colour all by ...' to base colours on model id, include file id, assembly id, part id, section id and material id; which updates all current graphics.

However the most recent 'Colour all by...' setting was not remembered, so that any further models read in (or items created) would always get colours assigned using the default PRIMER scheme.

The most recent 'Colour all by ... ' scheme setting is now remembered, and any future items created or read will use that scheme. For example if you have

coloured 'by model', then if you read in another model its items will all get default colours set according to the new model id.

- **Case 15890**

When 'centre on node (CN)' mode is in use the way viewing translations are applied changes slightly, and this was not being considered when testing for whether or not cached nodal screen coordinates were out of date prior to picking.

As a result node-based picking could select the wrong nodes if the most recent viewing transformation was a screen translation if CN was in force.

This problem also reared its head during V10 development since the changes to Sketching, which automatically centre the view at the centroid of the items being sketched, also uses this method.

This has been fixed.

- **Case 15058**

The drawing of nodal forces and moments (*LOAD_NODE) with -ve factors was a little bit misleading.

A force is drawn as 'arrow pointing at node, with head at node location' (in order to distinguish it from a nodal velocity which is 'arrow pointing away from node'). This was rendered correctly for +ve forces, but -ve ones simply put the arrow at the 'tail' end of the vector, which was not wrong but did not distinguish them from velocities.

This has been corrected, and -ve forces are now drawn as 'arrow pointing at node from -ve side', ie the mirror image of the +ve force symbol.

Moments were drawn using the same 'part circle round axis' symbol whether the moment was +ve or -ve, giving no visual indication of the change of sign.

This too has been changed: +ve moments still draw a +ve going circle, but -ve moments now draw the circle in the opposite direction, giving a more accurate visual indication of the direction of the moment.

- **Case 15053**

Shell triads could sometimes be displayed in global coordinates rather than local if the shells were very small. This has been improved.

- **Case 14956**

Spotweld beams drawn normally had opaque 'blobs' at their ends, however if 'true' sections were turned on these blobs were drawn in wireframe.
Now the blobs are opaque in all modes.

- **Case 14769**

If only part-based items (ie elements) are being drawn and a model is moved completely off the screen so that it is not visible then it may fail to draw when it is returned to the screen (eg by an autoscale).

This was due to the clipping test for all parts being off the screen being mis-interpreted as 'there is no need to redraw anything'.

It has been fixed by changing the order in which clipping tests take place.

Ipp

- **Case 15497**

IPP impactor positioning could leave the head giving a glancing blow rather than a direct one at some impact points. The algorithm has been improved in Primer10. The iterative use of the contact checker has also been speeded up considerably.

Image

- **Case 15971**

An issue regarding overlapping text in the Images panel has been fixed.

Include

- **Case 16938**

The closing of the include selection panel opened from edit panels could cause issues in subsequently opened panels. This has been corrected.

- **Case 16506**

When selecting include files to write you can now give path names which use directories that do not exist. Primer will create the directories as required.

- **Case 16393**

Copying an item resulted in the current include of the applicable model being set to the master file. This has been corrected so that the current include is preserved.

Include transform

- **Case 16940**

If a transformation was removed from an include file which was itself a child of an include transform then it would not be removed correctly. Now fixed.

- **Case 16732**

Primer would not change units for loadcurves correctly during *INCLUDE_TRANSFORM if the loadcurve was in a different include file to the keyword the loadcurve was used in. Now fixed.

- **Case 16558**

In version 971 R5 the meaning of IDROFF for *INCLUDE_TRANSFORM has changed from 'Offset to section ID and hourglass ID' to 'Used for all offsets except for those listed above'. Primer now uses this logic. Previously some items (e.g. airbag and deformable to rigid cards) were not offset properly as we did not know what the offset was.

- **Case 16517**

If you tried to add a new child include transform to the model by doing Add new child->*INCLUDE_TRANSFORM in the include tree then the new include was always made a child of the main file even if you tried to add the child to an existing include. Now fixed.

- **Case 16416**

*NODE_TRANSFORM definitions inside *INCLUDE_TRANSFORM files did not work correctly if the nodes in the set were not inside the include file (i.e. if they were in a different include file). This is now fixed.

- **Case 16286**

IDs of *INITIAL_STRESS_SECTION cards used by an *INCLUDE_TRANSFORM were not being offset. They are now offset by idnoff.

- **Case 15260**

When reading in an include transform containing a MAT34 card with AOPT set, Primer could give a message regarding orientation of the material axes, even if AIRBAG_REFERENCE_GEOMETRY is present for nodes/shells that use the material. This has been corrected.

- **Case 14920**

A new preference 'find_data_for_scan' and an option in the Model read 'options' panel have been added to make Primer NOT look for *PARAMETER and *DEFINE_TRANSFORMATION data when doing a model scan (reading). There are 2 consequences to this:

Firstly, if your include file uses parameters they will be missing and given the value 0 by Primer. Primer will warn you of this. Secondly, you will not be able to read any include transform includes as Primer does not know where the *DEFINE_TRANSFORMATION data is. They will be greyed out and unselectable in the tree.

Javascript

- **Case 16688**

If the ambiguous menu was mapped when using the Pick function from a script that used multiple windows, the windows could show strange graphics problems. Now fixed.

Keyword

- **Case 16858**

Labelling of INITIAL_VELOCITY_GENERATION cards, of type PART, could cause a crash. This has been corrected.

- **Case 16716**

Primer reads SENSOR_DEFINE_CALC-MATH & SENSOR_SWITCH_CALC-LOGIC but was not able to read SENSOR_DEFINE_CALC_MATH & SENSOR_SWITCH_CALC_LOGIC. This has been corrected.

- **Case 16690**

Two problems have been fixed in the *SENSOR keyword menus. Firstly there was a blank title field on *SENSOR_CONTROL, *SENSOR_DEFINE_ELEMENT and *SENSOR_DEFINE_FORCE. Now fixed. Secondly, if you created a latent *SENSOR_DEFINE keyword you would get an error message in the dialogue box. Now fixed.

- **Case 16622**

The following issues pertaining to the *SENSOR card have been resolved:
- Primer does not issue an error message when it encounters a blank string for LAYER in *SENSOR_DEFINE_ELEMENT cards.
- Default CTYPE value has been set to VEL (rather than VELOCITY) for *SENSOR_DEFINE_NODE.

- **Case 16526**

The *LOAD_HEAT_GENERATION keyword editor was incorrectly marking some new loadcurve fields as mandatory ones. This has been fixed.

- **Case 16478**

Error check for keyword *DEFINE_STAGED_CONSTRUCTION_PART is modified to allow it to have a part made of BEAMs.

- **Case 16414**

Some of the load curve fields in *LOAD_HEAT_GENERATION were incorrectly being considered mandatory fields in previous versions. This has been fixed.

- **Case 16171**

Primer now converts *BOUNDARY_FREE_FIELD_GROUND_MOTION to *LOAD_SEISMIC_SSI. The following changes have been implemented as well:
- <CID> is optional
- <SSID> is treated as a segment set when <ISG> is set to 1
- Only one of <GMX>, <GMY>, <GMZ> needs to be non-zero

- **Case 15993**

Following options for IEBT of *SECTION_SOLID_EFG are added
1) EQ.-1: (w/o transformation)
2) EQ.-4: (w/o transformation)
3) EQ. 5: Fluid particle (trial version)
4) EQ. 7: Modified Maximum Entropy approximation

Following options for IDIM of *SECTION_SOLID_EFG are also added
1) EQ.-1: Stabilized EFG method (apply to 8-noded, 6-noded and combination of them)
2) EQ.-2: Fractured EFG method (apply to 4-noded & smp only)

- **Case 15972**

Primer will now write the default value of X for the field 'DIR' in *DEFINE_COORDINATE_NODES even if this field was blank in the input file.

- **Case 15064**

NINT can now be set to 14 in *INITIAL_STRESS_SOLID cards. In addition, some errors in the handling of the NINT radio button in the corresponding keyword editor have been fixed.

- **Case 15028**

XOFFSET and NORMDIR fields were being processed incorrectly in some cases for *INITIAL_VOLUME_FRACTION_GEOMETRY cards. This has now been fixed.

- **Case 14870**

Added a new editing panel for keyword: *CONSTRAINED_JOINT_STIFFNESS.

Kwd editor

- **Case 17277**

The keyword editor for *INITIAL_VEHICLE_KINEMATICS had a bug where XO, YO, ZO were used in place of fields VX, VY, VZ. This has been corrected.

- **Case 17213**

The keyword editor for INITIAL_STRESS_TSHELL was incorrectly expecting a normal *ELEMENT_SHELL, rather than a *ELEMENT_TSHELL. This has been corrected.

- **Case 16663**

The situation could sometimes arise that a tall popup menu of sub-keywords in the keyword editor could disappear following selection of one of its rows. Typically this would be in the *MAT variant, where many different material types might appear in the list, making the popup very tall.

This was ergonomically unsatisfactory since the user would then have to invoke it again each time he made a selection.

This only occurred some of the time, and seems to have been due to a combination of tall popup menu and shallow screen, resulting in many panels being reconfigured and redrawn each time a selection was made and hence the popup menu getting 'lost' behind one or more other windows.

The keyword editor has been modified so that 'child' popup menus such as this will always remain 'on top' following anything that reconfigures and repaints its contents, and this seems to have solved the problem.

- **Case 16624**

The input fields on the keyword editor for SPR type constrained items has been updated so that some fields are now marked as OK being zero.

Labels

- **Case 17200**

There was an internal error in the way that model information was stored for items that had been picked.

This would not matter unless the following sequence occurred:

- User picked something, eg for dynamic labelling.

- User then renumbered model ids, changing the id of the model containing the picked item.

- The picked item was then redisplayed.

In the benign case this could result in the model prefix of the displayed item still showing the 'old' model id (for example M1/P1000 when it should have shown M2/P1000 if M1 had been relabelled to M2).

However if the 'old' model id no longer existed then this would probably cause a crash.

This has been fixed.

Loadcurves

- **Case 16362**

PRIMER has special logic to handle PGP encrypted Loadcurve, Table and Material data, and this was going wrong for loadcurves if the header *DEFINE_CURVE_TITLE was used. Without the optional _TITLE suffix it worked. When this was added, it used a copy of the title string instead of the 'BEGIN PGP DATA' line as the header for the encrypted data in the output.

This was because of an internal muddle over which line in the input deck contained the PGP header data, and has been corrected.

- **Case 15773**

*DEFINE_CURVE, *DEFINE_FUNCTION and *DEFINE_TABLE all occupy the same label range, despite being different keywords - in effect they are all sub-keywords of the generic type 'curve'. Accordingly PRIMER allows you to modify a 'curve' type within its editing panel to swap it between these keywords.

However the top level Tools menu separates these three types, and the selection menu used for Modify, Sketch, etc only lists the items of the type chosen. For example if you have some *DEFINE_CURVEs and some *DEFINE_FUNCTIONs then if you chose *DEFINE_CURVE the selection menus will only show CURVEs and not FUNCTIONs.

We have received complaints that this is inconsistent: if an editing panel allows swapping between types then the selection menus should also show all types, regardless of the sub-keyword (_CURVE, _FUNCTION, _TABLE) under which the operation takes place.

However there is an equally strong argument that a user accessing (say) _CURVEs will only want to see _CURVEs, and not the other categories.

Previously these selection menus used the CURVE TYPE filter to distinguish between the categories, and this was 'latched' externally so that while the option was there it was greyed out and could not be changed by the user.

In order to try to please both sides of this argument the filter remains, but it has now been 'unlatched'. This means that the initial menu will only show the relevant sub-type (_CURVE, _FUNCTION, _TABLE) as before, but the user can now unset the filter to show all items if he wishes.

Macro

- **Case 17152**

Spherical rotation and scaling with down +ve for dynamic viewing were not recorded to macros correctly. Now fixed.

- **Case 17132**

The formal name for assemblies used in mechanisms has changed from 'ASSEMBLY' to 'DUMMY MECH ASSEMBLY' to avoid confusion. If you recorded a macro in a previous version of Primer that created or modified an assembly then the macro will fail as it will not be able to match the window title. The macro must be edited. For example the line:

In Window('CREATE ASSEMBLY (for MECHANISM)')

would need to change to

In Window('CREATE DUMMY MECH ASSEMBLY (for MECHANISM)')

- **Case 17130**

When recording dynamic viewing in a macro, if 2 mouse buttons were pressed at the same time Primer could occasionally add 'Drag' commands to the macro which could not replay. This is now fixed.

- **Case 16066**

If the object menu 'key in' text box was used in a macro then an error message would be written when the macro finished playing (but the macro would play without any problems). Now fixed.

- **Case 15386**

If a macro was created in which stored views were retrieved, then these would not be implemented correctly on playback, instead the 'View get ...' command would effectively be ignored.

This was due to leading white space in the string on the menu row being removed during macro recording / playback.

Normally this would not matter, but in this instance it was required for a fixed-

format read of the view number to work correctly.

This has been corrected, and it is possible that this fix may also correct other obscure errors in macro playback when reading menu row data, although we are not aware of there being any problems of this nature.

- **Case 15297**

Macro playback did not work correctly for the part table (rows did not get selected). This is now fixed.

Mass

- **Case 16550**

Mass of beams using MAT_CABLE_DISCRETE was using CA*length to calculate the volume. This calculation should in fact only be used if VOL is zero.

- **Case 16497**

The part table has been fixed to take account of mass and inertia defined on *ELEMENT_INERTIA attached to a part. This is done unconditionally for a rigid part (and the mass added to the part mass), but for a deformable requires activation of the 'lumped mass on def' column.

- **Case 16318**

When using the Part > Properties function, the local inertia calculation for beams located at 0,0,0 and aligned in global coordinates was incorrectly returning zero. This has been corrected.

The inertia calculated by part table and part tree was not affected by this bug.

- **Case 16270**

The 'plot mass' button on the assign mass panel which displays mass of existing definitions has been corrected to obey any bounding contour limits set by the user.

- **Case 15710**

Previously the oa_pref setting 'assign_mass_includes_timestep_mass' meant that all assign mass would be recalculated according to the user's setting. Now the pref setting is applied when the assign mass is created and thereafter written to the keyword, so if the model is passed to other users, the assign mass will be recalculated according to the correct option.

- **Case 14965**

The Assign mass function previously allowed addition of mass with optional setting of CofG target.

In Primer10, the function offers the option of setting an Inertia target. Each individual term of CofG and Inertia tensor may be specified as a target value or set to '*' which means it will find its own value. The new iterative solution also permits considerably larger modification of CofG position than the old method.

Materials

- **Case 17172**

Card 3, 4 and 5 are modified to have AOPT field with corresponding fields for MAT_136.

- **Case 17148**

XP, YP, ZP fields are not available for MAT_033_96, *MAT_036 and *MAT_122. Also an error check has been put in for AOPT=1 for these materials.

- **Case 16621**

Contour plotting for density of MAT_187 is fixed.

The 7th field on card 2 and 3rd field on card 4 for MAT_187 are now blank to make it consistant with LS-Dyna software.

- **Case 16555**

For MAT206 (*MAT_PARK_ANG_BEAM) the fields BMUPS and BMUPT are listed twice and should be BMUNS and BMUNT respectively. This has been corrected.

- **Case 16545**

On the edit panel for *MAT_EROSION, the input boxes popups could get mixed up after using the panel slider. This has been corrected.

- **Case 16299**

Cij labels for *MAT_189 are made consistent with the manual.

- **Case 16228**

Axis of load curve for MXEPS field in *MAT_ADD_EROSION card are interchanged to make it consistent with the DYNA manual.

- **Case 16181**

On MAT_ADD_THERMAL_EXPANSION the loadcurve description is changed to 'LCID: Coeff vs Temp' from 'LCID: Coeff vs Time'.

- **Case 16072**

6 Optional cards are now applicable only for LCID2 = 0.

- **Case 16023**

Hovering is activated for field headers in *MAT_ADD_EROSION and *MAT_ADD_PERMEABILITY cards.

- **Case 15978**

*MAT_SPOTWELD_DAMAGE: Third line of data with field rupture strain (RS) is added to the card. This is the old *MAT_SPOTWELD_DAMAGE-FAILURE card with less fields in third row.

- **Case 15927**

Title of Keyword editing panel for *MAT_ADD_THERMAL_EXPANSION is changed to MAT_ADD_THERMAL_EXPANSION from MAT_ADD.

- **Case 15083**

The oa_index file for a material database will now also work if the material type line starts with '*MAT_' or 'MAT_' by mistake. It will also work if there are blank lines in the oa_index file by mistake.

- **Case 14765**

When importing materials (either through MAT->Import or through a material edit panel) the imported material always ended up in the same include as the original. This is correct, but any loadcurves/tables imported along with the material ended up in the masterfile. This has been modified to ensure any imported loadcurves/tables end up in the same include as the material.

Mechanism

- **Case 17209**

Some fixes and improvements have been made to Mechanism positioning.

Various errors have been fixed in LINE and HINGE joints:

+ A small error in the formulation of these joints has been corrected. This will improve their accuracy, and also improve the stability of the solution generally.

+ An error in the calculation of rotations of these joints has been fixed. This would have resulted in the reported angles for these joints only being correct if their motion during a single positioning pass lay within +/- 90 degrees of their position at the start of that pass. This would also have resulted in failure to rotate such a joint to a new position if the requested angle was more than +/- 90 degrees away from the current angle.

+ An error has been fixed which would have resulted in no motion taking place if the requested angle for these joints to be rotated to was exactly zero degrees.

+ The failure of LINE joints with unlimited +/- motion to calculate their current travel distance has been fixed. Not only would this not have been reported, but attempts to drive the joint to a given travel distance would have failed.

Some other improvements have also been made:

+ The stability and accuracy of the solution has been improved, meaning that it will now run correctly with much tighter convergence factors than previously. (Before it would have been likely to 'lock up'.) This should make it possible to achieve more accurate results for mechanisms that are a bit 'sloppy' with the default settings.

+ The convergence speed of the solution has been improved. Mechanisms should run a bit faster, and should converge on requested explicit solutions more quickly.

+ Feedback during 'driven motion' (user stipulates a position or angle) has been improved. Previously it would only report every 10 iterations, but now it will also report if two seconds have elapsed since the last report, giving more confidence that it has not 'frozen'.

+ Response to the STOP button during 'driven motion' has been improved. It is now checked much more frequently, which should get rid of potentially long delays between clicking on STOP and the mechanism calculation halting.

+ Diagnostic output that really should only have appeared for debugging purposes only has been removed. However a 'verbosity' setting has been added to the options panel to control the level of output, making it possible to turn it back on selectively which may help to diagnose problems.

- **Case 17185**

When positioning a mechanism in batch (or interactively) by moving points it could be frustrating that it gets 'stuck' at the first attempt, but then will achieve the desired position on the 2nd try.

This is because the 1st pass distorts the mechanism very slightly and this can loosen it just enough to permit it to get past the point where it got stuck the first time.

Therefore the 'Move point' logic has been modified slightly so that if it gets stuck then it will loosen the convergence tolerance slightly over a few iterations in an attempt to get it past that point, and then restore it to its original value if it succeeds.

This is a small change, but it may make the difference between success and failure in positioning a subset of mechanisms with difficult intermediate positions.

- **Case 15910**

In the command-line MECHANISM menu the fact that you can LOCK and UNLOCK a mechanism connection had been omitted from the help text.

This has now been added. (No effect on functionality.)

- **Case 15062**

When positioning dummies or mechanisms that have been imported from include files that have *DEFINE_TRANSFORMATIONs PRIMER tries to update the transformations rather than the nodal coordinates, so that the include file contents can remain unchanged.

Obviously this cannot work if more than one assembly has its nodes defined in a single include file, so PRIMER 9.4 checked for this and did not update the DEFINE_TRANSFORMATION in such cases.

However this check was defeated by a particular example in which all the nodes for multiple assemblies were placed in include file A, and all the element and part definitions in include file B, with the same DEFINE_TRANSFORMATION applied to both files. The check identified correctly that file A could not have its

transform modified, but failed in the case of file B because it tested only nodes.

Therefore the 'can I modify a DEFINE_TRANSFORMATION?' check has now been extended to look not only at nodes, but also at PART and ELEMENT definitions. If any include file contains any of these from multiple assemblies then it cannot have its transformation modified.

Note that it is still possible to engineer a situation in which PRIMER will get things wrong, in particular by placing nodes and elements for a single assembly in an include file, but also including in this file other structure not in any mechanism assembly. If this file is subjected to a DEFINE_TRANSFORMATION then PRIMER will update this, resulting in structure which is not part of the mechanism being moved along with it.

This comes down to sensible modelling practice, and anyone confused or affected by the above should read section 6.19.5 of the user manual where the rules for using *INCLUDE_TRANSFORM with mechanism assemblies are described.

- **Case 15041**

Mechanism positioning has been clashing the Connections where a connection exists between two assemblies.

Where the connection has been 'made' explicitly this is treated as joining the two assemblies together and will generate a warning in the pre-positioning check.

An 'Ignore Conn' option has been added which will stop such connections being considered, making it possible to continue with the positioning process. However it is important that the user considers whether continuing in this way will pull the connection apart, making it invalid, and it is recommended that any such connections are re-checked following position.

A related but subtly different problem also arose when a model contained items such as spotweld beams which Primer would use to make connections, but this 'making' process had not been carried out.

If the user ran such a model through the checker it would automatically 'Make' these connections (required in order to check them) and this would then stop the model from being positioned. This gave what looked like inconsistent and unreasonable behaviour.

The mechanism positioner can now detect when such connections have been 'automatically made' because of a check, and will ignore them silently.

Menus

- **Case 17009**

The MENU_AUTO_CONFIRM button in the Menu Attributes panel is exactly the same as setting the MENU_AUTO_CONFIRM environment variable, and can be used to turn off the 'prompt user and wait for confirmation' process. If set this takes the default response automatically in these situations and continues without waiting.

However if 'Save settings' is used in this panel the status of MENU_AUTO_CONFIRM is *not* saved in the oa_pref file, meaning that the effect of using this button is local to this session only.

This is intentional: interactive usage generally requires that the normal 'prompt and wait for response' action should be used, otherwise error and warning messages, and also help texts, will cease to work. So putting a setting in the oa_pref file which suppresses this behaviour would affect all subsequent sessions - both interactive and batch - and it might not be clear to users why these messages had disappeared.

Since batch usage is generally driven from scripts, and adding an environment variable to a script is trivial, it seems best to retain the policy that MENU_AUTO_CONFIRM can only be set externally via an environment variable; and that interactive setting during a session should be effective only for the duration of that session.

- **Case 16813**

In PRIMER (but also in other Oasys Ltd. LS-DYNA environment software) a problem with the file selector window has been observed on some Linux machines. The symptoms are that the first time it is used it appears 'on top' of all other windows, but the 2nd and subsequent times it appears 'behind' the PRIMER window, and if this is full-screen it will be invisible and will appear to lock up the PRIMER process.

This has only been observed on some Linux installations, and it seems to vary with Linux version and/or the desktop window manager used (eg KDE, GNOME, etc).

An environment variable FORCE_FS_REBUILD has been added to the version 10 software which if set (to anything) will force the file selector to be rebuilt each time, effectively always giving 'first time' behaviour, and hence making it appear in front of all other windows.

This cures the immediate problem, but it is possible that rebuilding the file selector box each time will slow down its creation. This is why FORCE_FS_REBUILD mode is not the default, and we would recommend that it is only used if it is necessary to cure this 'map behind' problem.

- **Case 16563**

It was possible when minimising Primer when waiting for a process to finish which produces a message panel to the screen that the message panel was inaccessible when maximising Primer again, hence locking the user out of Primer functionality. This only occurred on Windows and has been corrected.

- **Case 15409**

The environment variable MENU_AUTO_CONFIRM now applies to listing, confirmation and general panels in Primer.

Mesh

- **Case 17019**

Clicking 'Restart' in the shell->offset panel did not clear any shell selection. This has been corrected.

- **Case 16943**

The speed of splitting multiple shells has been improved. Also the newly created nodes will be created in the include file of the shell being split, rather than the current include.

- **Case 15841**

When using the mesh feature, if creating large numbers of nodes/elements while using the option to number the created items according to include numbering rules, the creation could take a long time. This has been improved.

- **Case 15135**

When splitting a shell Primer could occasionally merge the node to an existing one that you did not want it to.

The logic has now been changed so that a candidate node for merging has to be in the merge tolerance AND has to be on a shell that uses one node of the element edge being split and a shell that uses the other node of the edge being split.

- **Case 14981**

Meshing a line of beams using coordinates for the start/end points would only create 1 beam between the start and end points regardless of the element size was set. Now fixed.

Model build

- **Case 16855**

Model build from csv file now supports creation of the POS6P (affine) transform for GENERAL_TRANSLATE_TRIAD.

This method (and GENERAL_TRANSLATE_VECTOR) is (currently) only available for command line build.

- **Case 16652**

If a file of the same name exists in more than one directory, it is possible for the simple build method to select the wrong component file. Simple build works from a file written to the temporary directory. To enable the use of relatively defined includes within a component file, a change had been made to use *INCLUDE_PATH for simple build. The above is an unwanted effect of that change.

To satisfy both requirements as best we can, the code has been changed to run a first pass using absolute include filenames in the temporary file and only if that fails do we run a second pass using *INCLUDE_PATH.

- **Case 16354**

The .info file generated during model build from csv operations now includes information about failed cases.

- **Case 16226**

Models automatically keyed out in primer model build using the build from csv module or the database/template build panel (in simple mode only) do not correctly support the keyout of the model in relative mode. These were keying out with *INCLUDE_PATH defining the absolute paths and the bare filename under *INCLUDE, instead of the relative path under *INCLUDE. This has been corrected for pr10.

- **Case 15794**

Primer was generating spurious messages about subset label clashes on model merge or build. Fixed now.

- **Case 15715**

Two fixes have been made to the file selector for extra data files for components of model build.
- when a file is being replaced the directory for the file is the same as the old one
- cancel of selected file no longer loses the old entry

Model modified

- **Case 16532**

Model modified function now detects change of comments in a model. This applies both to header comments and those associated with individual keywords. The former test can be configured as off.

- **Case 16208**

Model modified will now detect change of header for an appropriate subset of keywords (e.g. *CONTACT..._OFFSET) even when there is no change of actual data on the card itself.

- **Case 16169**

Model modified will now report if label ranges for include files have been changed.

- **Case 15147**

When a previously latent item is created (e.g. to fix a model error), the include modified function was reporting that an item had been created but failing to highlight the include file.

Nastran

- **Case 16681**

Inertia components are read correctly now.

- **Case 16635**

When converting discrete elements, the stiffness value (defined with MAT_SPRING_ELASTIC_NON-LINEAR) is now written as 0.0 in place of xxxxxxxx.

- **Case 16469**

While translating the Nastran card CONM2 to *ELEMENT_INERTIA Dyna card, the fields I31 and I22 were getting swapped. Now this has been corrected and correct values for I22, I31 and mass are shown in *ELEMENT_INERTIA panel.

- **Case 16176**

The labels of elements created during Nastran keyout could change depending on how many Nastran models have been written out beforehand. This has been corrected.

- **Case 16163**

PBARL Nastran card with type I is now supported. In Primer, it is converted to SECTION_BEAM with cross section type SECTION_10: I-shape1.

- **Case 16160**

Messages are printed for all unsupported keywords.

Orient

- **Case 16742**

The orient to contact on the command line did not work if the parts being oriented and the parts against which contact was made were in the same model. This has been corrected.

- **Case 16703**

Undo when welds had been copy oriented with 'same part' set was deleting the original weld as well as the copy. This occurred only when the original weld had both a primer connection and *DEFINE_HEXA_ASSEMBLY.

Primer was failing to make a new HSWA for the copied connection and, as a result deletion became confused.

- **Case 16529**

With multiple models in memory the copy orient undo function did not work properly. This is now fixed.

- **Case 16285**

When a *LOAD_RIGID_BODY card is reflected in Primer, if a follower force/moment is used (DOF = 4 or 8) then the direction of the force/moment would be reversed due to the new node positions. Now Primer will retain the original direction by reversing the sign of the scale factor on the reflected card.

- **Case 16271**

Orient copy of Load-curves using label offset was offsetting the label incorrectly. This has been fixed.

- **Case 16201**

Orient copy of DEFINE_HEX_SPOTWELD_ASSEMBLY has been corrected to copy the underlying solids.

- **Case 15568**

Reflection of shells with beta angles was incorrectly implemented. As we adjust the shell topology to maintain the normal direction, we need also to negate the beta angle.

- **Case 15356**

Orient copy was incorrectly creating copied parts when certain keywords were copied, such as *ALE_MULTI-MATERIAL_GROUP, *INITIAL_VOLUME_FRACTION_GEOMETRY, *CONSTRAINED_LAGRANGE_IN_SOLID.

In same part mode, a copy of these should not copy the part.

- **Case 15144**

Copy orient no longer automatically performs autoscale on completion. It is now up to the user to press shortcut key 'a'.

- **Case 15039**

Primer would print an incorrect error message when using orient->copy on nodes/ements on a MAT34 part. The message has been corrected.

- **Case 10913**

The function that sets material ids to match part ids was not working when the material on the part card was latent (missing from the model). Primer was deleting the material and the part. The similar function for sections also did not work, but with less severe consequences. These have both been fixed.

Parameter

- **Case 16790**

Although it doesn't state this in the user manual, LS-DYNA will reject as invalid any characters in a parameter name that are not A-Z, 0-9 or '_' (underscore).

PRIMER now checks for these, and treats such a name as an error.

- **Case 16389**

There was an obscure error in the treatment of *PARAMETERs used on loadcurves in conjunction with a Units Change operation.

When the units of a loadcurve are changed this is performed by scaling the factors SFA and SFO, and leaving the values of OFFA, OFFO and all curve (x,y) points

unchanged. The reason is obvious:

X value = SFA * (X point + OFFA)

So scaling SFA makes it unnecessary to scale offset or point values.

However when considering the situation of changes to parameters used for fields OFFA, OFFO or any (x,y) curve points, the difference between 'no scaling is needed' and 'apply a scale factor of unity' is important. Both give the same numerical value, and (wrongly) no action was taken internally with the result that the logic which deals with units change affecting parameters was not being 'told' that a factor of 1.0 was being applied.

Normally this omission wouldn't matter if a parameter was only used on one of these unchanged curve data fields, but if it was also used elsewhere with a factor of something other than unity the clash in factors was not being detected with the result that the curve 'lost' its parameterisation, reverting instead to a plain numeric value.

This has now been fixed: the internal logic that handles units change for loadcurves now 'tells' the parameter logic about scale factors applied to all data fields, even when a factor is unity. This enables clashes to be detected and the user is notified about this.

- **Case 15657**

Prior to version 10 PRIMER calculated *PARAMETER_EXPRESSION using floating point arithmetic for all expressions, however LS-DYNA evaluates integer expressions as integers using the truncation rules common in languages such as Fortran and C. When an integer expression includes division this can have unexpected results, for example:

5.0 / 2.0 = 2.5 (floating point evaluation)

but

5 / 2 = 2 (integer expression, result truncated to integer)

PRIMER has now been modified to behave like LS-DYNA, and to apply integer arithmetic where appropriate.

However since users not familiar with traditional programming language rules may accidentally write an integer expression while expecting a floating result (as one would get from a calculator) PRIMER now evaluates all expressions twice: once with the integer rules applied and once with 'all floating point' arithmetic. If the results differ by more than 1 part in 1e6 a warning is issued that the result of the expression depends on integer truncation.

It is recommended that users wishing to make deliberate use of integer truncation make this explicit by using the int(x) function. This will make their intentions clear to anyone else reading their expression and will also stop the warning mentioned above being generated.

- **Case 15620**

Parameters in LS-DYNA are either 'real' (ie floating point) or integer, and PRIMER behaves in the same way.

However where an integer parameter expression was used it was originally evaluated in double precision floating point format, then converted to single precision floating before truncation to integer, with the result that the precision was about 7.5 decimal digits.

This matters if parameters are used to compute large labels of 8 or more digits, since the maths were not precise enough to evaluate these correctly.

Parameter expression calculation has now been modified so that:

- parameters are evaluated in double precision floating point format as before, which gives about 15 significant figures of precision.

- where an expression, or part of it, is 'integer' then it is evaluated using integer truncation rules.

- for integer parameters the result is retained in double precision format right up to the point where it is converted to an integer, thus the full 15 significant figures of precision are retained.

In practice a signed single precision integer is limited to the range +/- 2147483647, ie a bit more than 9 significant figures, and this will limit the precision of the outcome.

- **Case 15073**

If a parameter is edited in the main Parameter modify panel then, as with the keyword editor, the definition being changed is the 'live' one currently in use in the database, and not a scratch copy of it. (This limitation is necessary to permit changes in parameter Expression definitions to update correctly.)

This means that if other operations using parameters are in use at the same time, and the most obvious example of this is an editing panel using parameterised definitions, then there is a danger of the old and new values getting confused and hence the association between data field and parameter being broken.

Therefore Primer has been modified so that it 'knows' that a parameter is currently being edited, and it will continue to use the original (unedited) definition until the parameter is either updated with its new value, and this change propagated through the model.

To signify this parameters on editing panels will be displayed in magenta, and the hover popup will explain what is going on.

However it is recommended that this method of working is not used, and instead that parameters are edited as an 'atomic' operation, and not concurrently with other operations.

- **Case 14997**

A user attempted to update the values of parameters in a model by extracting the parameters from a different model, placing them on the clipboard, and them merging into the model to be updated.

This operation failed because the parameters names on the clipboard were the same as those in the model to be updated, which generated errors when the new (merged) model was created.

This was in fact a special case of the more general problem that the MERGE operation did not check for clashes between parameter names in the models to be merged.

This has been corrected as follows:

For the purposes of MERGE parameters have now been moved from 'rest of model', implicitly unlabelled, to the 'global' category.

For each parameter in the master model a check is made to see whether a parameter of the same name exists in the slave model, and if one does this is now detected as a clash. In other words a given parameter can only occur once, in the same way that other 'global' items (such as control cards) can also only occur once.

The options for resolving this clash are the same as for other 'global' items, and the user can now choose which source model should be used for these parameters.

The 'simple' MERGE options (increment slave labels unconditionally or on clash) now also work correctly.

- **Case 14091**

When two models containing parameters of the same name were merged together this could generate an error.

Now duplicate parameters are treated a bit like other 'once only' items such as control cards, as follows:

+ If the 'auto fix' option of 'use M1, increment M2' is used, then the parameter definition in M1 is used, superseding that in M2.

+ If 'Use M2, increment M1' is used then the opposite happens: the definition in M2 is used, superseding that in M1.

There is no mechanism to 'rename' (cf 'relabel') duplicate parameters to prevent clashes. If this is required it will have to be done manually before the merge operation.

Part table

- **Case 16498**

Models with rigid parts with no material defined were causing the part table to crash on set up. The attempted lookup of material constraint has been inhibited for such parts.

- **Case 16492**

Occasionally the model mass shown in the part table could be truncated. This is now fixed. Additionally hover text is now used in the table so that if table 'cells' are not wide enough the whole string can be viewed.

- **Case 16051**

When writing the part table as a CSV file strings containing a comma are now quoted.

- **Case 15136**

If parameters are used on the part table, Primer can now update a field if the parameters underlying value is the same as the previous value. Previously Primer did not do this.

Part replace

- **Case 16435**

If a model contains *ASSIGN_MASS definitions without any mass group and part replace is performed with the option to remake the assign mass, a crash may occur. This is fixed.

- **Case 16298**

Part replace of rigid part with accelerometers was only re-attaching node N1. This is now fixed.

- **Case 15973**

Part replace now has an option to transfer Initial stress and Initial strain cards from the source model to the target.

Part tree

- **Case 17113**

The part tree could give harmless button colour fill error messages if it contained fully transparent parts. This has been corrected.

- **Case 16977**

When in part tree contents mode, if right clicking on a loadcurve and clicking 'edit' the edit panel would not open. This has been corrected.

- **Case 16418**

Primer could crash if using the 'Information' popup in the parts tree if the Primer session contained multiple models. This has been fixed.

- **Case 16412**

If the PART tree was undocked in either D3PLOT or PRIMER then clicking on a row in the part tree on the right hand side of the window didn't do anything if the mouse was futher right than the original right hand edge of the menu before it was undocked. This has been fixed in 10.0.

- **Case 15980**

A number of issues pertaining to the Contents mode of the Part Tree have been resolved. These include:
- Problem with display of spurious DATABASE and MATERIAL entries
- Problem with popups in the list box
- Problem with list box headers

- **Case 15230**

Fixed a bug that would retain branches DAMPING_MODAL and DAMPING_GLOBAL in the Part tree (CONTENTS mode) even after their removal from the model using editing panel.

- **Case 15113**

When using the 'Report include mass' function when right clicking on an include file in the part tree, the mass reported only considered the mass in the include file chosen, it did not include the mass in any children/grand-children etc. of the chosen include file. The mass calculation has been updated to include any children.

Penetrations

- **Case 16692**

The crossed edge checking algorithm, used by Primer's contact checker, could report spurious crossed edges on windows/linux machines due to an ill-conditioned calculation to which those platforms proved sensitive. This has been corrected.

- **Case 15457**

An error message 'Contact check: No value calculated for s' could be produced in very rare occasions when checking contact penetrations. The message was harmless and did not affect the results. This has now been fixed.

- **Case 15152**

The treatment of CONTACT_AUTOMATIC_SINGLE_SURFACE in the penetration checker has been improved to more accurately accord with Dyna's treatment. Previously, at mesh corners, Primer was reporting some penetrations which Dyna does not and missing some which does Dyna report. Primer now uses the parametric of the node to the penetrated segment to determine the treatment.

Users will notice that Primer10 gives a considerably lower number of spurious penetrations than previous versions.

Preferences

- **Case 16342**

The preference 'extensions_for_database_from_dir' did not always work for compound strings (such as '.k;.i'). This could result in the failure of the function 'create database from directory' to find all files that it should.

Quick pick

- **Case 16827**

When using Quick Pick 'only' with type ENTITY, with more than one model on the screen, things could behave in strange fashions: blanking what shouldn't be blanked, and sometimes refusing to restore the status quo following a middle mouse click.

This was caused by the picking routines presenting all the different types that form part of ENTITY to the blanking routines in an order that they didn't expect, and hence confusing their logic.

This has now been fixed.

- **Case 16490**

Quick-pick blanking/only operations on include files are now not applied to materials/section etc contained within the include. Previously, all materials within the include were actioned, therefore it was possible for an 'only' to display parts that were not in the include. This was inconsistent with the part tree, and has been corrected.

- **Case 15824**

The quick pick 'Key in' box is now greyed out for include files as it cannot be used.

- **Case 15076**

On Linux and Unix platforms only the Quick Pick 'information' box did not work properly if the user made an ambiguous pick and then selected the required item from the ambiguous menu.

The 'information' popup would appear, and the ambiguous selection menu would be unmapped, but then the 'information' popup would disappear again after about 1/2 a second - too quickly to enable it to be read.

This has been fixed, and the 'information' popup box will now persist on the screen for the item selected from the ambiguous menu until the user moves the mouse back out into the graphics window to make a new selection.

Read

- **Case 16726**

When reading a model into an existing model you can now interactively set which include file (if any) in the existing model you wish to read the new model into. This replaces the 'Layer flag' option previously used for such an operation.

- **Case 15694**

Primer would not read some Abaqus *ELEMENT and *ELSET cards if the number of entities per line varied. This has been corrected.

Renumber

- **Case 16268**

Feedback messages are now printed to the dialogue box to tell the user if items have not been renumbered (during a renumbering operation) due to cross references to DATABASE_HISTORY cards.

Rigid bodies

- **Case 14859**

Primer now supports part duality for the following keywords, i.e. the field may be either a part or a *CONSTRAINED_NODAL_RIGID_BODY.

*CONSTRAINED_EXTRA_NODES
*LOAD_RIGID_BODY
*INITIAL_VEL_RIGID_BODY
*BOUNDARY_PRESC_MOTION_RIGID
*DEFINE_DEATH_TIMES_RIGID
*TERMINATION_BODY
*LOAD_BODY_PARTS

Rigidify

- **Case 16944**

The rigidify function when applied to one side of a welded part which used a constrained type contact was liable to create an excessive number of penalty contacts (node-set to shell-set) to tie on the spotwelds, which would otherwise become detached due to constraint clash.

Now primer will just create a single penalty contact.

- **Case 16834**

The rigidify function has been corrected so that PART_COMPOSITE can now be rigidified.

- **Case 16323**

The rigidify function (also used by the seatsquash function) could fail if you had a latent element in the model. This has been corrected.

Scripting

- **Case 17242**

When resetting the 'ID' or 'CID' fields on a database history item in JavaScript, it was possible to retain some old cross-references. This has been corrected.

- **Case 17076**

The Keyword() function in the Set class did not return the complete keyword. This has been corrected.

- **Case 16924**

The parameter editing panel would not work for an editing panel started from using Edit() in JavaScript. Now fixed.

- **Case 16801**

For Edit() and Create() Javascript functions you could not daisy-chain (open subsequent edit panels) when in modal mode (default). This has been corrected.

- **Case 16644**

For constructors with optional label arguments, adding this argument as zero could cause the entity not to be created. This has been corrected.

- **Case 16643**

The LENL and LENM fields for the DATABASE_CROSS_SECTION_PLANAR constructor were required when they should have been optional. This has been corrected.

- **Case 16594**

Primer will now blank/unblank underlying parts and elements when blanking/unblanking materials through JavaScript.

- **Case 16363**

If the user tried to get the x2, y2 and z2 properties for the Conx class the wrong values would be returned (the x, y, or z properties would be returned respectively). Now fixed.

- **Case 15951**

The Material property 'type' would return '*MAT_ELASTIC' instead of 'ELASTIC' etc. Now changed to return just 'ELASTIC' etc (which is what the API documents). If you want the full name use the Material function 'Keyword' instead.

- **Case 15276**

Blanking and unblanking methods were not set up correctly for the Dummy and Mechanism classes. This has now been fixed.

- **Case 15219**

The SPC class now supports the _BIRTH_DEATH option and the associated fields.

- **Case 15160**

Primer could have problems setting a part HGID value or SECID value on certain platforms (HP being one of them). This has been corrected.

- **Case 14602**

Using Xrefs.Type() and Xrefs.GetID() did not work correctly for Curve objects. This is now fixed.

- **Case 14509**

The Joint constructor only took 2 nodes. 2 alternatives have been added. You can now have
new Joint(m, Joint.SPHERICAL, n1, n2, optional_id, optional heading)
new Joint(m, Joint.REVOLUTE, n1, n2, n3, n4, optional_id, optional heading)
new Joint(m, Joint.TRANSLATIONAL, n1, n2, n3, n4, n5, n6, optional_id, optional heading)

Seatsquash

- **Case 16789**

The file filter for selecting dynain files for seatsquash was *.*, even though dynain filenames usually do not contain a '.'. This has been changed to '*'.

Selection

- **Case 16833**

When filtering PARTs in object menus the options 'by material' and 'by material type' (and their thermal material counterparts) did not find PART_COMPOSITE definitions using these materials.

This was because PART_COMPOSITE stores multiple materials in a list of properties by integration point, rather than a single explicit material.

This has now been fixed: when filtering by these methods all integration points are checked, and if any point matches the specified material the part will be selected by the filter.

- **Case 16186**

If some existing category of displayed items (eg shells) was turned on or off in the ENTITY panel, and then a short-cut key (eg S for Shaded) or an explicit drawing command were used to redraw the image, then screen-picking of the changed items could be wrong.

If they had previously been displayed, but were now turned off, then it might still be possible to screen-pick them; conversely if they had been turned off, then on again, screen-picking might fail to select them.

Changing display modes (eg LI following by SH) or using UPDATE on the ENTITY panel, would fix this problem.

This was due to failing to consider correctly all situations in which the internal table of is visible on the screen, and hence eligible for screen-picking, needs to be updated. One such situation was a change in the 'entity' switch status for items, and this has now been corrected.

Sets

- **Case 16713**

In models with SET_GENERAL/GENERATE definitions, for a rigorous test of whether or not a node is in a set primer needs to build data tables which requires decomposition of every such set. To ensure the data is always up to date, when required the tables will always be rebuilt if any operation has occurred which has updated the data of the model (e.g. update on an edit panel).

On a very large model with many SET_GENERAL this may prove an excessive overhead. So an interactive panel has been introduced which will give the user the opportunity to switch to non-rigorous method, effectively ignoring SET_GENERAL/GENERATE. The panel will only appear on model/machine combinations where this is detected as a problem.

Shortcut

- **Case 15902**

If the was depressed then the 'D' short-cut key would initiate cut-section dragging, but mouse movement would not in fact move the section. This is now fixed.

- **Case 14204**

From version 10.0 onwards only the non default shortcut key settings are written to the oa_pref file when the user selects the option to save the shortcut keys.

This applies to PRIMER, T/HIS and D3PLOT.

Sketch

- **Case 15917**

The ability to sketch *INITIAL_STRESS_DEPTH and *LOAD_STIFFEN_PART has been added.

- **Case 14274**

*PERTURBATION entities can now be sketched.

- **Case 8094**

Sketching of large contacts has, historically, tended to be quite slow in Primer. There was no single reason for this, but rather a host of small things which conspired together in this context to slow down the graphics.

Sketching generally, and specifically sketching of (contact and other) segments, has been speeded up. It's still not lightning fast, but it is definitely better.

Translators

- **Case 12837**

ABAQUS translator is enhanced to support *NSET card and various element types for solid and shell.

User interface

- **Case 16964**

When using the 'Menu Attributes' panel to change display factor or font sizes the text in GUI buttons changes size, but that in dialogue and listing boxes does not. (Although it will be resized when the Primer session is restarted.)

This has been corrected so that dialogue/listing box text will now resize dynamically, allowing a better impression of what the final appearance will be.

- **Case 16500**

A new preference has been added

[code name]*checkpoint_dir: [directory] or 'none'

If a pathname or directory is given then checkpoint files will be written there instead of in the default location. If 'none' is specified then checkpoint file output will be suppressed.

- **Case 15845**

There was a bug in the graphical user interface which meant that if a listing box (eg help text, check output, etc) was created, and the horizontal scrollbar was used to move across to the right, then this scrollbar position was 'remembered' the next time the same listing box was used.

This not only looked a bit odd, but also if the old text was 'wide' but the new text was 'narrow' then scrolling far to the right could result in nothing being visible!

This has been corrected.

- **Case 15361**

When using the keyword editor the sequence:

- Highlight several rows
- Click in a text box somewhere in a highlighted row
- Without making any changes, click elsewhere

Resulted in the equivalent of <enter> being pressed in that text box (a standard response of the menu system) with the result that all buttons in that column of the highlighted rows would change to that value.

This is not strictly a bug, but this behaviour is too 'hair trigger' to be safe, so it has been modified as follows:

- Click in text box, then click elsewhere without changing the highlighted box contents, will no longer result in the equivalent of <enter>, and no data entry action will be taken.

- Click in box, followed by a change to box contents, *will* result in the equivalent of <enter> following a click elsewhere.

- Click in a box, followed by pressing the <enter> key, *will* update contents, regardless of whether or not any change was made.

- Double-click in a box will also update contents, tantamount to <enter>, whether or not any change was made.

These changes will make the response of the keyword editor less sensitive to accidental clicks in the wrong place.

- **Case 14779**

The *CONSTRAINED_EXTRA_NODES editing window was initially mapped at too small a size, this has been fixed.

Write

- **Case 16664**

On vary rare occasions you could get a warning message about label clashes for beam, spring and /or seatbelt elements during keyout when the message was not required. This has been corrected.

- **Case 16620**

When a user working on windows selects to use Unix format for the keyout of include file names (i.e drive mapping from windows to unix), Primer will now automatically use unix format (line endings) for the files written.
This obviates the previous need to set the ascii_file_format pref.

- **Case 15363**

Keyword output of an input deck containing many *CONSTRAINED_TIED_NODES_FAILURE cards in the default 'classic' output sequence can be slow.

This is because each tied nodes definition references a separate set, which is written out immediately after it, and the lookup of this requires a search which can be slow.

This has been speeded up for this case, and also other keywords where the situation might occur of many keywords, each referencing one of many sets.

Ztf

- **Case 16708**

When a ztf file is written automatically on keyout (pref setting), the name (and directory) was being derived from the last file keyed out. This did not work well for models with includes!

The code has been corrected to derive the name/directory from the master file (as utilities function ztf keyout does)

- **Case 15170**

If *CONTROL_SPOTWELD_BEAM is used to convert any spotweld beams into single solid element spotwelds then the spotweld beams are not written to the ZTF

file. Instead it contains a spotweld solid data block with the spotweld solid elements that LS-DYNA automatically creates. This means that data components can be read from the LSDA file and applied to the correct solid elements so D3PLOT correctly shows results on any spotwelds in the model.

If *CONTROL_SPOTWELD_BEAM is used to convert any spotweld beams into either 4 or 8 element assemblies then the spotweld beams are not written to the ZTF file and NO additional spotweld assembly or solid data is written.

If D3PLOT plots spotweld data for a model using this option then data is correctly plotted for any solid, cluster, constrained and generalised spotwelds (that were manually defined in the model) but nothing is plotted for the solids that LS-DYNA automatically generated to replace the spotweld beams.

2.2 D3PLOT

2.2.1 Bugs Fixed in 10.1

Cut section

- **Case 18099**

When a second model is read into an existing window, and that 2nd model contains *DATABASE_CROSS_SECTION definitions imported via the ZTF file, then a crash could sometimes occur.

This has been fixed.

- **Case 17516**

If a model had both DATABASE_CROSS_SECTION_PLANE and DATABASE_CROSS_SECTION_SET definitions then D3Plot could crash when doing a vector plot.

This has been fixed in 10.1.

Database

- **Case 17823**

Using the Compressed PTF function could crash D3Plot if the model was large (>2GB of data per state). Fixed now.

Deform

- **Case 17566**

If you had a Model (M1) in Window 1 and another Model (M2) in Window 2 and then picked some nodes to define the coordinate system for shift deformed it correctly got applied to both models.

If you then put M2 in W1, the shift deformed definition was incorrectly being ignored for this model/window combination. If you defined the coordinate system after putting M2 in W1 it worked correctly.

This has been fixed in 10.1.

Graphics

- **Case 17765**

On occasions screen-picking might fail to select a part or a part-based element.

This could occur when a new state was selected, and a previously blanked part was unblanked. The newly visible part might not be pickable.

- **Case 17700**

On Windows platforms if D3PLOT is started in 'open files in directory' mode with several models selected, and the master window is iconised while it is busy opening these, then when the master window is restored it can initially be

completely black. A small resize of it restores the proper layout, and the code then works normally. Now fixed.

- **Case 17575**

Some problems with 2D retractor and slipring plotting have been fixed.

The way LS-DYNA writes output for 2D belt elements has changed during the life of release 971. Early versions would write out the parallel rows of underlying 1D belt elements, retractors and sliprings, whereas later versions do not.

The ZTF file contents have been modified accordingly, and plotting in D3PLOT has also been revised.

Image

- **Case 18036**

If a JavaScript resized the graphics window before capturing an image then the font sizes in the captured image would be wrong (they would look correct on the screen). This has been fixed in 10.1.

Measure

- **Case 17672**

'Point' measurements were not being read correctly from the settings file. This has been corrected in 10.1.

- **Case 17663**

When deleting a measurement in the measure menu, in certain circumstances you wouldn't be able to re-pick anything to measure. You had to press the Tools->Measure button to reactivate picking. Fixed in 10.1.

- **Case 17338**

The values reported by the measure function for Nastran models were the scaled coordinates rather than the actual coordinates. This has been fixed in 10.1.

- **Case 17312**

If a model was read in with a settings file that was created without any measurements having been defined (or a pre 10.0 settings file) then the current measurement was set to 0 by mistake instead of 1. This meant that when the user tried to create a measurement the 1st one would not be displayed after it was created. Any measurements created after the 1st one would be displayed correctly.

Menus

- **Case 18030**

The menu 'hover over' function could produce error messages in the dialogue box and/or not highlight anything when more than one model was present in the database.

- **Case 17875**

If in version 10.0 the 'Layout' menu was used then the 'Data' menu would not be displayed again until either the Layout menu was closed or one of the other tool menus was used.

This has been fixed in 10.1

Quick pick

- **Case 17989**

Quick Pick by include file or group was not working correctly for the 2nd and subsequent models in a window. They would be picked correctly, echoing the right selection to the dialogue box, but then the correct action (eg blank) would not be applied
Now fixed.

Read

- **Case 17877**

If the user performed a File > Model reopen operation, but the model could not be read for some reason (eg files deleted / renamed) then a crash could occur.

Utilities

- **Case 18086**

The PTF compress function would crash D3Plot if both the following were true:

1. The model being compressed had been output with LSDYNA compression so that rigid shell output was suppressed (<dcomp> on the *DATABASE_EXTENT_BINARY card).

2. Shell components were selected for output.

This has now been fixed.

- **Case 17792**

D3PLOT could crash with a Fortran read error when opening a model if the name of the model ended with 7 or more contiguous digits. For example:

my_model_27022011.ptf

The reason for this is that D3PLOT searches for associated filenames, and appends '001' etc to the name in the process, for example in the case above it looks for settings file:

my_model_27022011001.set

Unfortunately when appending '001', '002' etc suffices it converts the trailing characters into a number, and a 10 or more digit string is too large to fit into a single precision integer, causing the crash.

This has been fixed in V10.1 by only looking at the last 9 digits, but users experiencing problems in earlier versions can solve the problem by reformatting their filename so that it doesn't contain more than 6 digits at the end. For example using the name above could be reformatted to:

my_model_27_02_2011.ptf

which would work because the last numeric string '2011' is only 4 digits long.

- **Case 17315**

If the file selector was used on a PC to browse for a model database then the initial directory displayed was always reset to the current working directory while for a single PTF file the last used directory was displayed. In version 10.1 the directory that the last database was read from is the initial directory displayed.

Also, if a new empty heading was added to a database using the 'insert' option then selecting the new heading before any models were added below the heading would cause everything in the database to be selected.

Scripting

- **Case 17454**

Non modal JavaScript windows would not work in D3PLOT (and T/HIS). Now fixed.

Selection

- **Case 17957**

If the 'delete' key was used to clear items that were being sketched due to a quick pick action like label, then after clearing the sketched items the selection mode was incorrectly changed to 'pick point' as though you were trying to create a measurement. This has been fixed in 10.1

T/his link

- **Case 17764**

After using dynamic viewing in a T/HIS graph when running the D3PLOT->T/HIS link, the timeline position (if the timeline was being displayed) would not update correctly if the D3PLOT state was changed. If the T/HIS window was autoscaled or something else was done to make the graph update then the timeline would start working correctly again.

- **Case 17679**

When running the T/HIS link the following warning message could be displayed in the D3PLOT dialogue window if the model contained time histories for BEAM elements.

%%% WARNING %%%
Ambiguous BEAM
Could have been BEAMS
BEAMS_SPOTWELD
BEAM_BOLT

This message was generated by mistake and D3PLOT would continue to run correctly.

In version 10.1 this message is no longer displayed.

- **Case 17676**

If you opened a model in D3PLOT and then started the T/HIS link, and then opened another model in D3PLOT but put the model in Window 1 instead of using the default 'Next' option then an error message was written saying that window 102 was already in use to the dialogue window and the model wouldn't appear even though it had been read in correctly. If you read the model into the 'Next' window and then moved it to Window 1 then everything was fine. This has been fixed in 10.1.

- **Case 17314**

The model numbers could get out of sync between D3PLOT and T/HIS if, when you started the T/HIS link you had already read some models in and then deleted some of them so you didn't have models 1>n. If for example you only had models 4 and 6 in D3PLOT then T/HIS would label these as models 1 and 2.

User interface

- **Case 17716**

In the popup used to select which shell surface to plot, pressing the help button could sometimes select a random surface. This has been fixed.

Utilities

- **Case 17520**

It was possible to try to write a Compressed database using dialogue commands (/UTILITIES PTF_COMPRESS) without selecting any parts or states to write.

This resulted in an error message about allocating memory.

A check has been added to make sure parts and states have been selected and a more meaningful error message is given.

Volume clip

- **Case 17746**

Clipping volumes didn't clip connections. They now do in 10.1.

Xy plot

- **Case 17667**

The dialogue commands for the XY Data menu was missing an option to turn off displaying the graphics box with the XY plot. The command '/XY_DATA PLOT' has been added to turn it on or off.

- **Case 17559**

In Deform->Ref node, if a single reference node was selected and the option to 'Use reference values for the output of current coordinates in WRITE and XY_DATA results' was set, the components CY_CURRENT_Y_COORD and CZ_CURRENT_Z_COORD would not be calculated correctly. The CX_CURRENT_X_COORD component would be returned instead.

This has been fixed in v10.1 and 11.0.

Ztf

- **Case 17819**

D3PLOT 10.0 would fail to find the ZTF file automatically created by PRIMER if the job was submitted using the Shell and the output files from LS-DYNA used the LSTC naming convention.

If the job was submitted in this way then the PTF files would be called 'd3plot', 'dplot01' ... while the ZTF file created by PRIMER would be 'jobname.ztf' (where jobname is the name of the keyword file). When the 'd3plot' files were read into D3PLOT it would look for 'd3plot.ztf' and 'ztfile' and then fail to find either file. In 10.1 D3PLOT had been changed so that if the LSTC naming convention is used the D3PLOT now looks for

a) d3plot.ztf
b) ztfile
c) If neither exists it then searches for the newest '.ztf' in the directory.

2.2.2 Bugs Fixed in 10

Contour

- **Case 16581**

When using a 'cylindrical' local coordinate system the data shown on a plot could be misleading if that state had not first been drawn in ordinary (global or local) mode. Once done so rendered results would be correct thereafter. This has been fixed.

In addition a new 'User defined' coordinate system option has been added in which the user can define a fixed, arbitrary local axis system by giving the direction cosines of its axes.

- **Case 16329**

If you went through exactly this sequence:

Perform a data plot (eg SI) of some component in auto contours mode;
Switch to manual contouring and set some different max/min limits;
Step forward one state;
Step back to the original state.

The image of the original state would not be updated to show the revised contour bands. It has now been fixed.

- **Case 14677**

In a solid model where peak data component values are in wholly internal elements (with no external faces, and hence not drawn) contour plots can be confusing because the reported contour bands may not match the reported max/min values.

This is because contour bands only display the limits of what is actually drawn (ie external faces) and explicitly exclude wholly internal items.

To try to reduce confusion D3PLOT will now report the max/min item in a plot as before, but if either (or both) of these are internal then it will also report the max/min 'visible' item if this is different.

A related problem was that if the max/min element was wholly internal to the mesh its label did not get sketched. This was because of the logic which tries to sketch only on visible faces, and this has been amended so that if no faces are visible the element still gets labelled at its centre location.

Cut section

- **Case 15905**

In WRITE and XY_DATA the option to extract cut-section forces and moments (the SECTION option) was 'live' even when the section was turned off.

This was not strictly an error as it is not necessary to have a section turned on to calculate forces, but it confused and worried some users. Therefore the SECTION button will now only be 'live' in those contexts when the cut section has been turned on.

- **Case 15709**

If you go into the cut-section panel and immediately select 'options' followed by rotation, then drag the section, you get button overwrites poking through. Cut sections still work, and dismissing and restoring the panel fixes the problem.

This was due to a menuing error and has been fixed.

- **Case 15196**

Cut-section location plots could show things that should not have been visible. This is now fixed.

- **Case 15188**

Prior to V10.0 D3PLOT did not draw 'basic' space (lagrangian) cut sections correctly in 3D graphics mode, making it necessary to swap back to 2D graphics to get a plot, and even then it was not really complete and suffered from the general deficiencies of 2D graphics.

This limitation arose because basic space cut sections cease to be flat as the model deforms, making it difficult to use hardware clipping planes to render the image correctly.

V10.0 now renders 'Basic' space cut sections correctly in 3D mode.

3d, 2d and 1d elements have their symbols clipped correctly where their undeformed geometry intersects the plane; other elements with only a single node or unconnected topology (eg joints, rigidwalls) are treated as either wholly clipped or wholly visible.

- **Case 9146**

In the cut-section panel, the quick output of forces updated as a section was dragged through the model, but did not update with a change in state. They now do.

Data access

- **Case 17141**

From version 10.0 onwards D3PLOT now uses the data from the nearest LSDA state when it matches the data times in the LSDA file with the PTF state times. If the difference between the nearest LSDA time and the PTF time is > 10% of the PTF state interval then D3PLOT also displays a warning message in the dialogue window when it first opens and reads the LSDA file.

- **Case 16946**

D3PLOT will draw the distribution of shear force and moment down beams if these are 'resultant' types using a material model such at MAT_29, and if the output of 'extra' beam data has been requested on the *DATABASE_EXTENT_BINARY card.

This worked correctly, showing the distribution of moment and rotation with the exception of two data components:

MMD_MOMENT_MAGNITUDE_DISTRIBUTION and
RMD_ROTATION_MAGNITUDE_DISTRIBUTION

These were showing the

Vector magnitude of (Y end 1) + (Y end 2) at end 1
and
Vector magnitude of (Z end 1) + (Z end 2) at end 2

When what they *should* have been showing was

Vector magnitude of (Y end 1) + (Z end 1) at end 1
and
Vector magnitude of (Y end 2) + (Z end 2) at end 2

This has now been corrected.

- **Case 16346**

In versions 9.4 to 9.4.2 any LSDA 'Other' data components would be reported as being zero if the model had been compressed with Femzip, this has been fixed in 10.0.

- **Case 16301**

Two problems with the extraction of scalar data at nodes have been fixed:

(1) In the WRITE menu choosing to extract data for nodes left the SURFACE button active, but pressing it did nothing.

This meant that when extracting shell-derived data it was not possible to stipulate which surface should be used.

(2) In the XY_PLOT menu the SURFACE button functioned, and worked correctly for explicit integration points. However if the MAX_ALL, MIN_ALL or MAG_ALL options were selected they did not work correctly.

Both these problems have been fixed, and for the case of integration point dependent data extracted from shells & thick shells it is now possible to choose the full range of surface / integration point options for nodal data in these two contexts.

(Surface / intg point can be specified for nodal results derived from other data types, but will be ignored.)

- **Case 15337**

If the order of the SPC data components in the 'd3plot.components' file was reversed so that the translational one was 2nd then all values were reported incorrectly as zero. This has been fixed in 10.0.

- **Case 15287**

When performing 'criterion' principal stress/strain plots the reported max and min values would always be zero.

The max/min calculation was not being performed correctly for these plot types, and this has now been fixed.

Deform

- **Case 16221**

When performing an 'envelope' plot the result would always be zero if, prior to selecting the envelope mode, a reference state had been defined. In addition the ability to define reference state data was 'greyed out' during envelope plotting.

The first problem was due to an internal error and has been fixed. In addition it is now possible to define and modify reference state data while in envelope plotting mode.

Envelope

- **Case 16491**

Envelope plotting can be slow for big models and D3Plot can appear to hang whilst it scans the states. Some feedback has been added to the dialogue box to show which state it is currently scanning.

A scan of the states can be halted by pressing the 'Stop' button if it is taking too long.

- **Case 16112**

If nodal data was contour plotted using envelope and then relative values were turned on in the deform->ref_node menu, the contour values did not get updated. To get the correct plot you needed to change the component then set it back to the component you wanted.

This is now fixed.

- **Case 16074**

Doing a 'Scan' of results in the Write menu with envelope on could give the wrong results. It would only write out the values of the currently selected state. This is now fixed.

Also, if an envelope plot was done and the envelope type was changed, e.g. from Maximum value to Time of maximum value, the contour plot and the contour bar values would update correctly, but the min/max labels would stay unchanged. You had to plot the model in a different mode and then contour plot it again to see the new max/min values. This is now fixed.

General

- **Case 16885**

If the directory selector was used in either D3PLOT or T/HIS to find and open multiple models before the file selector was used then both D3PLOT and T/HIS could crash on UNIX and LINUX machines.

This has been fixed in 10.1.

- **Case 16356**

In some menus (e.g. Animate->Select States, Utilities->Compress->Select States) states can be selected by setting a start, end and interval time. This did not work properly if the analysis termination time was greater than the number of states in the model. This is now fixed.

Graphics

- **Case 16981**

When using AVI files as the background animation in a window D3PLOT first decompresses these into 'frames', in order to give a rapid playback.

It was allocating excess memory for these frames, 4x too much on 32 bit applications, and 8x as much on 64 bit ones.

This has been corrected, and the result will be that the code will use 4x (32 bit) or 8x (64 bit) less memory for this function, resulting in the ability to display larger AVI files.

- **Case 16889**

When more than one model is in the database repeated 'reread' operations on multiple models could result in an error message about an attempt to delete a non-existent window.

This did no harm, and the programme would continue to function normally, however it could be alarming for users.

It has been fixed.

- **Case 16683**

If Undeformed geometry was turned on this would render correctly, and if some sort of 'Deform' option (eg magnify displacements) was then used this too would render correctly. However when the deform option was subsequently turned off the undeformed geometry would sometimes be drawn using the deformed coordinates.

This was due to an internal error and has now been fixed.

- **Case 16588**

AC (Autoscale Current) originally ignored airbag particles when computing a new scale.

This was deliberate since experience with early implementations suggested that many particles could leak, and travel a long way, giving rise to very small scales.

However the algorithm has now been improved so that particles inside the airbag (no leakage) are now considered when computing a scale.

Particles which have leaked are only considered in this context if no other structure is visible and there are no 'unleaked' particles in the airbag.

- **Case 16538**

When capturing images on a PC it was possible for the line width in D3PLOT windows to be drawn incorrectly if the D3PLOT->T/HIS link was being used and T/HIS graphs were also being captured. This has been fixed in version 10.0.

- **Case 16494**

In some circumstances D3PLOT might clip out a part (or contact surface or airbag) wrongly at certain scales. This would only happen if:

+ The entity switch for the element types in question is off
+ The user changes to a state not previously rendered
+ The entity switch for the element types is turned on again

Changing views, changing states, or a range of other operations that might affect item visibility would all correct the situation.

- **Case 16333**

Integrated beams defined with a tubular section were being displayed as solid circular beams when the 'true section' option was on.

This was due to the incorrect value being used for the internal radius of the tube and has now been fixed.

- **Case 16095**

If resultant beams were defined explicitly with a cross section type, rather than an Area, Iss, Itt etc. they would only get drawn as a simple line in D3Plot if beam true sections was turned on in the Display Options menu.

- **Case 16037**

In rare circumstances the contour bar in the 2nd and subsequent windows might not have its colours filled in. Sometimes this would happen on the screen, and sometimes only when images were captured to file.

This would only happen in the following circumstances:

+ Transparency was in use in the window
+ The wireframe overlay was turned off
+ No labels or other extra items were being drawn.

- **Case 15867**

The code would sometimes fail to draw an edge on a triangular face of a Wedge or Tetrahedron solid element when drawing all edges - typically in wireframe and/or hidden-line mode. Free edge display was unaffected.

- **Case 14561**

The display of total virtual memory was incorrect for a 64 bit executable on HP-UX, which could cause the 'virtual memory alarm' to trigger prematurely.

Image

- **Case 16887**

On some platforms (probably Linux, but we have seen it on Laptops running Windows too) the left and bottom border can be omitted from screen plots and/or images captured from the screen.

Menus

- **Case 16230**

If multiple models with different entity types were loaded into the same window in the entity panel didn't update correctly to show all the available types for the 2nd and subsequent models.

- **Case 16225**

In version 9.4 the 'Tidy' button only tidied menus, it didn't reset the position of graphics windows. In version 10.0 the 'Tidy' button now has a popup hanging off it with 3 options

Tidy Menus - Tidies up just menu boxes (same as 9.4)
Tidy Graphics - Tidies just the graphics windows
Tidy Menus and Graphics - Tides both

The 'Tidy' button just does the menus so it's behaviour is the same 9.4.

2 new shortcut options have also been added to the list of shortcuts you can assign to keys, 'Tidy Graphics' and 'Tidy Menus and Graphics'. These are in addition to 'Tidy Menus' that was already there. The 'C' and 'c' keys are still mapped to 'Tidy Menus' by default but users can obviously change this to 'Tidy Menus and Graphics' if they want to.

- **Case 16109**

If a model contained beams with more than 20 integration points, if you tried to select integration point 2 to plot from the Data->Integration->Int pnts 1-20 popup, the help menu would get mapped.

Movies

- **Case 16343**

In D3PLOT if a movie was captured where the window also had an AVI background and the T/HIS link was being used, the resulting movie would sometimes not contain the model and all you would see was the AVI background. This is now fixed.

Multiple wdws

- **Case 15179**

In version 9.4 and 9.4.1 zooming in and out using either the mouse scroll wheel or the zoom in/out shortcut keys would only apply to the window the mouse was in even if the Caps Lock key was pressed. All of the other dynamic viewing events would apply to all active windows if Caps Lock was pressed. Version 10.0 has been modified so that Caps Lock now works with the scroll wheel and the shortcut keys.

Part tree

- **Case 16699**

If the Part Tree menu was used to display groups using the 'only' option then D3PLOT could crash due to an internal memory error. If 1st you displayed shells and beams using 'only' and then displayed groups the memory usage would rise rapidly until D3PLOT ran out of memory. This is now fixed.

Properties

- **Case 15229**

When using external data (blob plot) files in Reporter and D3PLOT the title specified for the external data could get lost if it was not given in the external data file itself. This would happen if, during image capture, the user specified a title.

This has been corrected in V10, and the external data component title will now be 'remembered' in subsequent Reporter template playbacks.

Scripting

- **Case 16970**

If a Javascript generated a lot of output to the dialogue box it could appear to 'hang' on Windows platforms if the keyboard focus was moved away to a different window, for example by clicking on the window of a different application.

It was in fact still running, but appeared to be stalled. This has now been fixed.

- **Case 16040**

If the Javascript function SetCutSection() was used to create a cut section using the LS_DYNA method the orientation could be incorrectly set. This was due to an internal error and has now been fixed.

Selection

- **Case 16623**

If 'attached node' visibility was turned on then a quick pick 'only' operation on parts or elements would have the effect of blanking all nodes, and not even restoring them for the visible elements.

This logic has been changed so that an 'only' operation will only blank nodes if they have been made explicitly visible by using the (Entity panel), All Nodes switch.

Blanking and unblanking of nodes is always a difficult topic for which there is not always a right answer, but this gives a more logical and intuitive behaviour.

- **Case 14988**

Picking 'all visible' items restricted what was selected only to those within the current screen rectangle.

This has been corrected: 'all visible' now picks what would be selected by the operations:

+ Autoscale model
+ Pick within a rectangle of the whole screen

T/his link

- **Case 15843**

If a T/HIS graph was changed from a 'CHILD' to a 'SIBLING' the size of the old parent D3PLOT window wasn't being recalculated. This meant that if you were working with a single D3PLOT window and one T/HIS graph then the graph

would cover half of the D3PLOT window.

If after changing the graph type any of the page layout options were used then the D3PLOT window size would be adjusted correctly.

- **Case 15323**

If an image was captured in version 9.4 while using the D3PLOT->T/HIS link the option to automatically set the background to white was ignored in any T/HIS graph windows. This has been fixed in 10.0.

User defined

- **Case 16684**

If a user data file (.ucf) was in the users home directory and a model was read in with a settings file which referenced some user data from file (e.g. a .csv file), the user data component from the csv file would be read twice. If you then tried to delete the duplicate components D3Plot would crash.

If the .ucf file was removed from the home directory everything worked correctly.

This was due to an internal error and has now been fixed.

- **Case 16579**

D3PLOT was giving the wrong answers when performing 'reference state' calculations with user-defined data components.

- **Case 15434**

When user-defined data components were used, and then settings files were used as a template to save and reload future runs, a problem could arise that the user-defined component reloaded from the settings file was different to that originally stored in it.

This could also arise when replaying Reporter .ort files, since they use settings files to reconstruct the status when the original images were recorded.

The problem was due to the fact that settings files stored the fact that the Ith user-defined component was used, where I was its internal number. However if user-defined components from other sources were detected on replay then the internal order of user-defined components could change, meaning that internal index I referred to something else. (This is not a problem with built-in data components since they never change their internal indices.)

The problem has been fixed by storing the name of the user-defined component in the settings file, and reloading the correct index on replay by looking up this name in the list of components.

Write

- **Case 16434**

Writing out elements at nodes in the WRITE menu could add on an extra element if you selected a list of nodes to output and the number of elements attached to each node was different. This is now fixed.

- **Case 16237**

In Write->Keyword if you tried to write out initial stresses for shell elements and you set the number of integration points to output to a number lower than the number in the shell, the values could be incorrect. This was due to an internal error and has now been fixed.

The number of integration points the user can output has been limited to 1, 2 or #int pts. This is because it is not always obvious which values should be mapped on to the new integration points in some situations. Limiting it to these values, the user can get the middle, outer surfaces or all integration points.

Ztf

- **Case 17252**

When reading a ZTF file a crash could occur if both:

- The version of D3PLOT is a 64 bit one.
- The keyword deck contained *SECTION_SHELL and *INTEGRATION_SHELL

- **Case 15362**

A mis-match between the contents of the ztf file and a ptf file could cause D3Plot to crash.

This could happen if the Utilities->Compress function had been used to write a cutdown model which contained spotweld beams. If the beam parts were not selected for output, D3Plot would crash because the ztf file contained spotweld beam information, but there was nowhere to put them in the cutdown model. This is now fixed.

2.3 T/HIS

2.3.1 Bugs Fixed in 10.1

Fasttcf

- **Case 18047**

If a wild card was used to delete curves in a FAST-TCF script

delete A*

then this would also delete any curves from a previous FAST-TCF run which also had tags starting with A.

- **Case 18046**

If a FAST-TCF script generated images using the 'page' option to specify the graphs instead of the 'graph' option then it would fail to overwrite an existing image with the same name if it already existed.

- **Case 17662**

In version 10.0 the command line option to set the label for the 2nd y-axis (/de la 2dy) didn't work correctly, this also meant that the option didn't work in FAST-TCF. This has been fixed in 10.1.

Image

- **Case 17755**

Images were not generated correctly in T/HIS if any of the labels were changed from the default helvetica font when capturing images on windows with the option ‘Screen resolution’ set.

If any other font was used then the labels drawn using that font would be missing from the image (using helvetica and just changing the font size worked fine).

This has been fixed in 10.1.

Menus

- **Case 17584**

In version 10.0 T/HIS would incorrectly interpret the option to set the graph title if the title string started with a 'Q' or 'q'. T/HIS would assume this meant 'quit' the current command. This has been fixed in 10.1.

- **Case 17561**

If a curve was read in from a curve file which had a filename longer than 70 characters (including the file extension but not the directory path) then T/HIS would crash if the user right clicked on the curve to display the curve information.

This has been fixed in 10.1.

- **Case 17553**

If the page layout was changed so that there were no graphs left on the current page, T/HIS didn't automatically change to the previous page that had some graphs. If there were only graphs left on page one then the Page buttons would be greyed out and you couldn't then change page.

From 10.1 onwards T/HIS will automatically change page to one that still contains some graphs.

- **Case 17543**

If the 2nd Y axis was turned on for a graph so that the curve manager displayed additional tick boxes for selecting which curves used the 2nd axis then the tick boxes would not update correctly if the menu was resized / scrolled if none of the graphs on the current page used the 2nd Y axis. This has been fixed in 10.1.

Read

- **Case 17939**

If the first line of data in a CSV file contained any missing values

i.e. 0,0,0,,0
0,0,0,,

then T/HIS reported the wrong number of columns (both of these examples should be 5) after scanning the file and wouldn't read all of the columns.

- **Case 17706**

If a model was opened in T/HIS by double clicking on a THF or XTF file and the user then used the 'Read Curve' menu to read in a T/HIS curve file then returning to the 'LS-DYNA' option in the Read menu would reset the menu to the Open Model screen.

If instead the user had opened the model by browsing for a file and then returned to the 'LS-DYNA' menu after reading a curve file the menu would correctly display the available entity types and components without having to open the model again. This now happens for the first case as well.

- **Case 17678**

When reading a LSDA (binout) file generated by LS-DYNA 971 R.4.1 (MPP) T/HIS would incorrectly read the section names from the SECFORC data. The problem is actually caused by this version of LS-DYNA writing out the ID and Title twice for each X-Section and getting the 1st Title wrong. T/HIS 10.1 has been modified so that if it reads data for a X-Section a 2nd time then the second title is stored in preference to the 1st one.

- **Case 17554**

T/HIS 10.0 could crash if it attempted to read data from an SLEOUT ASCII file which didn't actually contain any contact energies. This could happen if SLEOUT output was requested in the LS-DYNA file but the model didn't contain any contact definitions. This has been fixed in 10.1.

- **Case 17345**

While searching for the files associated with a model T/HIS would sometimes try and open the 'jobname.ztf_log' file instead of the 'jobname.ztf' file and would then give an error message that the file couldn't be read. This problem would only occur in the following were all true

1) Running T/HIS on a PC
2) The LS-DYNA output files were using the LSTC naming convention 'd3thdt, xtfile'
3) The directory contained both the '.ztf' and '.ztf_log' files
4) There wasn't a 'ztfile' in the directory.

Selection

- **Case 17336**

If the keyin boxes were used to select input curves for curve operations then the 1st time the boxes were used the correct curves would be selected, after that the entered curves plus all the previously selected curves would be chosen. If for example you entered #3 for the 1st group and then #5 for the second group then curves 3 and 5 would be selected in the second group. If you then entered #7 in the 1st group you would end up with 3,5 and 7 being selected.

This has been fixed in 10.1.

Shortcut

- **Case 17949**

The default shortcut key 'y' didn't work in 10.0. This should scale the Y axis using just the points that are visible on the X-axis. The shortcut would work with an upper case 'Y'. This has been fixed in 10.1

T/his link

- **Case 17861**

After using dynamic viewing in a T/HIS graph when running the D3PLOT->T/HIS link the timeline position (if the timeline was being displayed) would not update correctly if the D3PLOT state was changed. If the T/HIS window was autoscaled or something else was done to make the graph update then the timeline would start working correctly again.

If the timeline was switched on when the D3PLOT state was at a non-zero time then the timeline was initially drawn at time 0.

2.3.2 Bugs Fixed in 10

Data access

- **Case 16899**

From version 10.0 onwards Plastic Strain data for shells can be extracted for each individual integration point as well as for the top, middle and bottom surfaces.

If you want to extract the Plastic Strain for a specific integration point there is now a Plastic Strain component within the 'Stress' menu. It has been added to this menu as the stress tensor components are also available for each integration point while the strain tensor components are only available for top, middle and bottom.

- **Case 16826**

In version 9.4 the curves generated in T/HIS when reading multiple entities from the binout file might be generated in a different order to the list of entities displayed in the menu. In some cases the items written to the binout (LSDA) file are not written in order of increasing ID and T/HIS sorts them into order before displaying the list of available items. When the curves were actually generated the curve ID's were being assigned based on the unsorted order. This has been fixed in 10.0.

- **Case 16814**

If an entity name (for something like *DATABASE_HISTORY_SHELL_ID) was defined in LS-DYNA that was just a single character long then the name would not be stored and displayed correctly in T/HIS. This has been fixed in 10.0.

- **Case 16647**

Rigidwall forces were not read correctly from the XTF file. This would only affect SMP runs if the BINOUT file wasn't present and T/HIS was using the XTF file for rigidwall data.

- **Case 15940**

In version 10.0 the option to plot 'Total Mass' for a PART has been removed. In 9.4 the 'mass' value read from the MATSUM branch of the LSDA file was incorrectly assumed to be the total mass of each PART when in fact it was the added mass.

Fasttcf

- **Case 17074**

From version 10.0 onwards if a FAST-TCF script contains the commands to write a range of curves to a CSV or CURVE file

csv2 E:\test\problem_about_t-his\binout\FX2_ver01.csv #1:#10 auto

and the range doesn't contain any curves then a warning is now generated instead of an error. The rest of the script is then processed as normal.

- **Case 17004**

If a FAST-TCF script was created for curves created using a TRAnslation operation, the playback would fail.

- **Case 16768**

Version 9.4 of T/HIS could fail when running a FAST-TCF script in a directory where the user didn't have write permissions as T/HIS would try and generate some FAST-TCF scratch files and output in the directory.

In version 10.0 T/HIS will try the directory specified by either $OA_HOME, $HOME or $USERPROFILE if it can't write to the current working directory and if these don't exist it will then try $OA_TEMP, $TMP or $TMPDIR.

- **Case 16471**

If a FAST-TCF script was generated for one of the functions that produces more than one output curve (BLC, RS, NIJ etc) and some of the output curves were deleted or blanked then the FAST-TCF commands that deleted curves would delete the wrong ones.

- **Case 15775**

If a curve was read in from a curve file while running a FAST-TCF script and the curve file contained curve TAGS the curve could end up getting tagged twice internally in T/HIS. This could result in multiple curves having the same curve tag and subsequent curve operations could use the wrong curve. This has been fixed in 10.0.

- **Case 15557**

The normalising factors used in the COR3 operation were not being set properly when replayed in a FAST-TCF script.

General

- **Case 16245**

In previous versions of T/HIS the option to define the number of decimal places to display on axis values didn't work if the axis was plotted using a LOG scale. This has been fixed in 10.0

Image

- **Case 14934**

If an image was captured at either 2 or 4 times the screen resolution and the window had a background image being displayed then the captured image would not be correct on a PC.

- **Case 14923**

In previous versions of the Oasys Ltd. LS-DYNA environment software the 'Creator' field in the summary information of a PDF file created by T/HIS, PRIMER or D3PLOT was always set to 'T/HIS' regardless of which program actually created the PDF document.

Operations

- **Case 17017**

The peak matching part of the correlation functions COR1 and COR2 sometimes gave unreasonably low scores for almost identical curves. This was because they only considered up to 10 matching peaks. They now consider an unlimited number of peaks.

- **Case 16973**

The COR1 and COR2 operations returned NaN if the curves being compared only had two points.

- **Case 16921**

The COR1 and COR2 functions assume that both curves have monotonically increasing X-values. T/His now checks to ensure this is the case and will offer the user the option to continue or stop.

- **Case 16630**

Turning on the 'Redefine frequencies' option in the Design Spectrum (DS) Seismic operation did not work if you turned it on in the screen menu. T/His would always return an error message 'Spectrum requires too many points'. It worked if you did the operation through the dialogue command.

Also, the text on the button always said 'NO' even if you turned the option on. It now says 'YES' if it has been selected.

- **Case 16473**

The Response Spectrum function calculation assumes that the input curve has a constant timestep. If it doesn't the output can be wrong.

There is now an option to auto-regularise the curve before doing the calculation.

- **Case 16454**

When using the FFT operation, if an input curve has N points, T/HIS correctly pads the input curve with trailing zeroes to obtain a number of points (Np) that is an exact power of 2.

After doing the FFT, the y-axis of the FFT curves were scaled by Np/2. They should have been scaled by N/2.

- **Case 15854**

The COR1 and COR2 functions were returning a score of 0.0 for the area of curves that were almost identical.

The problem was that the curves oscillated about 0, so the total areas were close to 0. The relative difference between the two areas was high because of the small numbers involved, resulting in a poor match.

To guard against this situation the absolute area (+ve area + abs(-ve area)) of the curves are calculated and compared instead.

- **Case 15807**

The matching for the timing of flat-top peaks has been improved in the COR1 and COR2 operations.

The times of the flat peaks are now taken at the middle of the span of the peak making low marks for poor matching of timing less dependent on small rounding errors.

Read

- **Case 17062**

In version 9.4 of T/HIS you could not open 2 models in the same directory if there was a binout (LSDA) file as it wouldn't open the same file for multiple models.

Version 10.0 has been modified so that you can now open multiple models in the same directory. T/HIS will now open the same binout twice but it will generate a warning message in the dialogue window if you are using the same file for 2 or more models.

- **Case 17022**

Due to an internal error T/HIS could crash when reading a CSV file that contained ',,' where a complete column of numbers wasn't defined. This has been fixed in 10.0 and more feedback is now written to the dialogue window showing what was actually read from the file.

Successfully read curve 1 from CSV file => #1 Number of points : 727
No points read for curve 2 from CSV file => #2
Successfully read curve 3 from CSV file => #3 Number of points : 822

- **Case 16979**

T/HIS wouldn't read in curves properly from a Keyword file if there wasn't a white space between the SFA and SFO entries on the *DEFINE_CURVE card.

This would work

*DEFINE_CURVE
1 0 1.0 1.0011E10 0.0 0.0 0
0.0 0.0
1.0000000 1.0000000
2.0000000 2.0000000

This wouldn't

*DEFINE_CURVE
1 0 1.01.00111E10 0.0 0.0 0
0.0 0.0
1.0000000 1.0000000
2.0000000 2.0000000

- **Case 16666**

In version 9.4 the option to swap between displaying model titles and directories in the model Reread panel didn't work if the panel was started via the 'Reread' button in the read menu.

- **Case 14905**

In version 9.4 the option to automatically extract curves to match those already read from a model didn't work if the option to open multiple models in one go was used. Because of this problem the option was disabled in 9.4.1 when opening multiple models.

T/his link

- **Case 16783**

In version 9.4 T/HIS quick pick operations could stop working when using the D3PLOT > T/HIS link if the option to re-read a model in D3PLOT was used. Sometimes QP would continue to work but it would depend on which pages each T/HIS graph was positioned on.

User interface

- **Case 16536**

If the curve manager was undocked in T/HIS then by default it would cover the area where any other menu was displayed. If the user then selected one of the other menus the curve manager would have to be moved before the other menu could be seen.

In version 10.0 the default location of undocked windows has been changed so that they don't fully cover the area used by docked windows. This makes it easier to see when a menu in the docked area changes.

2.4 Reporter

2.4.1 Bugs fixed in 10.1

Conditional formatting

- **Case 17794**

If multiple conditional formatting conditions were set for an auto-table cell, then Reporter would display the last condition matched rather than the first one. This has been corrected.

Graphics

- **Case 17551**

Reporter could give an error message if using the colour 'none' for certain JavaScript Image class properties. This has been corrected.

User interface

- **Case 14307**

If the page layout was changed from portrait to landscape or vice versa then items that were off the page appeared to be 'lost' as they were not drawn. Items are now automatically moved to be on the page if required.

2.4.2 Bugs fixed in 10

Conditional formatting

- **Case 15320**

Any conditional formatting applied to a program type object could not be edited once created. This has been corrected.

General

- **Case 15548**

On item edit panels, 'spinbox' inputs that allow floating point numbers to 1 decimal place could sometimes have rounding errors. This has been corrected.

Generate

- **Case 16936**

When running Reporter through the Shell, it will now only run D3Plot and T/HIS in batch mode when the user specifies this is what they want to do. Previously Reporter would run in batch mode automatically if certain output types were selected.

- **Case 15154**

Reporter could use up CPU when waiting to generate D3Plot objects. This has been corrected.

- **Case 15143**

Checkbox for turning on/off error checking during generation when an error was found was not working correctly. This has been corrected

Graphics

- **Case 15527**

Primer would write the thickness of a border of a program item to a PDF file as a rounded integer, which meant that the thickness of the line could come out slightly thinner than expected. This has been corrected.

Preferences

- **Case 15528**

The reporter 'placement' setting did not work correctly on Linux with dual monitors.

Scripting

- **Case 15220**

Added logic to the script that creates D3Plot data from Reporter variables so that the variable that is read directly as an argument is converted to uppercase before use. Previously the variable could be ignored if in lowercase.

- **Case 14639**

The script for listing include files did not work if the include file names were split over multiple lines using the ' +' continuation.

User interface

- **Case 14230**

The text on the status bar at the bottom of the screen could get overwritten leading to an unreadable status message during the generation of objects. This has been corrected.

Variables

- **Case 16306**

Reporter could not install a variable on the command line that contained an equals sign (=) in the variable value.

Write

- **Case 12216**

Reporter would only be able to write a PowerPoint file once during a session. This has been corrected.

2.5 Shell

2.5.1 Bugs fixed in 10.1

Multiple jobs

- **Case 16557**

In the Reporter options panel, the DEFAULT_DIR and DEFAULT_JOB variables were being set for the normal job rows, but not for the summary report. They now are.

Also, if an input file name is not specified the variables will be set to the values in the output dir and root output filename textboxes.

User interface

- **Case 17297**

Sometimes the options windows could be too small and they could not be resized to make all the buttons visible. In v10.1 and v11.0 they can now be resized if they are not big enough.

Variables

- **Case 17988**

Variables ending with a \ (backslash) would not be passed properly from the Shell to Reporter.

Trailing '\'s are now removed from variables before they are passed to Reporter.

2.5.2 Bugs fixed in 10

General

- **Case 16135**

Setting the option to run Primer in batch mode had no affect on Unix machines.

- **Case 15357**

If the first memory limit was changed and the second limit (for MPP) was left blank, after submitting a run the second limit would automatically get filled in with the original value of the first memory limit. This could be annoying if the memory limit had been increased from the default and more than one job was going to be run as subsequent runs might not have enough memory. Now fixed.

- **Case 14974**

Setting the option to run Primer in batch mode had no affect on Unix machines.

3 Enhancements

The enhancements and bug-fixes for each program have been broken down into a series of topics. Within each topic enhancements and bug-fixes are listed by case ID (most recent first).

3.1 PRIMER

3.1.1 Enhancements in Version 10.1

- Case 17843/17125

Several enhancements to belt fitting have been added to PRIMER 10.1:

- Transverse twist at belt end and fixed points (e.g. at sliprings) can now be controlled. (Previously only the outward radial direction could be changed.)

- The maximum transverse curvature of the belt can now be controlled during fitting. This stops a multi-row belt 'digging into' concave geometry on the structure.

- All belt fitting parameters can now be specified in the oa_pref file.

3.1.2 Enhancements in 10

Adhesive

- **Case 15977**

Primer will now mark an adhesive connection as INVALID if it has failed to make 50% or more of the max possible solids along it's length. The 50% value is able to be modified using a preference.

Airbag

- **Case 15116**

A new error check has been added to AIRBAG_PARTICLE to check the user has not set illegal values for STYPE1 and STYPE2.

Airbag folding

- **Case 14255**

Subset folding can now be used for spiral folds.

Assembly

- **Case 14481**

The ability to pick assemblies from the screen has been added. The picking is based on nodes and elements in the assembly.

- **Case 14480**

Primer can now create part sets of assembly contents directly by right clicking on the assembly in the part tree. The part set can also be linked to the assembly, so

that any change in the part contents of the assembly will be applied to the part set contents.

- **Case 14413**

Automated model build operations using csv files now generate log files that include directory name, target coordinates and first contact point corresponding to every loadcase.

Attached

- **Case 14188**

Primer can now save settings for entities to find attached through to the oa_pref file. This will then be read and applied in the next Primer session rather than using the defaults.

Bom

- **Case 13526**

The Bill of Materials now writes the titles of section cards.

A BOM Read can be used to modify titles on section cards.

Belts

- **Case 16060**

When remeshing a seatbelt definition, or a subset of one, Primer searches for existing retractors and sliprings and implicitly assumes that the new definition will want either to reuse or recreate these on the new definition.

Even if 'delete' is used during manual remeshing to get rid of the old belt definition, these sliprings &/or retractors will be recreated.

Therefore a new option 'none' has been added to the radio button set of options for dealing with the end condition of belt segments:

```
+----------------+
|[ ] Automatic | Default, reuses/reproduces existing item
|[ ] Existing | Allows user to define a specific existing item
|[ ] None | New option: suppresses element at this point
+----------------+
```

If 'none' is used then that end of the belt segment will be a plain 'fixed point' (or 'end' if at the end of the belt) with no slipring or retractor being generated.

- **Case 15225**

The ability to control more aspects of seatbelt refitting has been added to the command line (/BELT) interface.

PR_BASIC, basic properties, allows control of the basic belt definition and meshing parameters: width, length, thickness, #rows; and also parameters controlling the belt path form-finding.

PR_REFIT, refit properties, permits command-line modification of the belt refitting parameters in the auto-refit panel, notably including whether or not to

delete the old belt, whether to reuse its labels and the maximum number of iterations.

Checking

- **Case 17214**

A new check has been added to ensure INITIAL_STRESS_SHELL/TSHELL values are different for each integration layer.

- **Case 17075**

A new check has been added for incorrect nodal order for type 19/20 solid elements.

- **Case 16676**

A check has been added to report any non-structural nodes in a node set which defines slave side of tied/spotweld contact as an error. It seems that LS-Dyna will not initialize if this is the case.

- **Case 16552**

Added a new *CONTROL check - element beams cannot have element formulation 1, 2 or 11 if running a linear implicit analysis (*CONTROL_INPLICIT_SOLUTION with nsolvr set to 1).

- **Case 16026**

For *AIRBAG_WANG_NEFSKE the combination of TVOL !=0, T=0, LCT !=0, CV & CP=0 and A !=0 can cause Dyna to fail. A warning has been added for this combination.

- **Case 15780**

Added a new error check for the following combination, which causes an error termination in LS-Dyna:

A part using MAT 123 with an hourglass card of type 6, 7 or 9 when running in version 971R3.

- **Case 15690**

A check has been added for a massless node on *DEFINE_COORDINATE_NODES. This will be reported as a warning if the system is unreferenced, but an error if it is referenced.

- **Case 15651**

A model check warning has been added to report cases of optionally labelled items (e.g. contact) where some have explicit labels and some do not. This is bad modelling practice. It can result in contact IDs in the LS-DYNA output files being unpredictable.

- **Case 15566**

Added error check for +ve value in field in *MAT_054-055.

- **Case 15459**

If you created an item inside an include transform file with a label less than the offset for that type (or modify an item's label to be less than the offset) it would have a negative label when written.

A new include file check has been added to look for this and renumber as necessary as an autofix.

- **Case 15299**

Material check for MAT24 was only reporting error 'yield stress <= 0' if a load-curve was defined. This error is now also reported for cases where yield is defined in tabular data or in the SIGY slot.

- **Case 15259**

A new preference setting has been added to suppress interactive text box messages from occurring during model keyin. These will instead be written to the read log. In this mode the default option will apply for those messages which require user input.

- **Case 15231**

The Error message 'DATABASE_HISTORY_NODE: None defined' is now shown as Warning.

For contacts, an error is no longer reported for the combination IGNORE=0, SOFT=2.

- **Case 15226**

A new preference has been added 'create_connections_from_welds_on_check' which is on by default. If users have large models with welds without connections, switching this setting to off will speed up model checking, by omitting connection creation and checks on spotwelds. The result will however be less rigorous, so the setting is not recommended.

- **Case 14957**

Primer now issues error messages when solid sections with <ELFORM> set to 1 or 2 contain degenerate elements without parameter <ESORT> on *CONTROL_SOLID set to 1.

- **Case 14915**

Various checks have been added to inform of the case where element_shell_thickness applies in preference to the thickness specified on the section card. Additionally, the part table in such cases will now report EL_SH_THK for the gauge of such parts and prohibit edit.

There is also a warning if some but not all shells of part have *INITIAL_STRESS_SHELL(_SET) or *INITIAL_STRAIN_SHELL(_SET).

- **Case 14897**

If the master side of a tied contact contains shells which are overlapped by other shells (the parts of which may or may not be included in the contact definition), the process by which LS-Dyna decides to which shell a node ties becomes rather random. If the shells are of different thicknesses, a node may tie or not tie unexpectedly. Furthermore, changing the thickness of the part in contact may not have the expected result.

Primer model check will issue a warning if the master side of tied contact contains any case of overlapping shells of different thicknesses.

Note that Primer's own tied contact check will always use the thinnest segment

(by default) so a node reported as tied will always be tied. In the case of overlapping shells, LS-Dyna *may* tie more nodes than Primer reports.

- **Case 14871**

Added a new error check for *AIRBAG_PARTICLE to trap parts in part sets <SID3> that are missing from part set <SID1>.

- **Case 13278**

An error check for Beam and Discrete elements with free end is now available and can be controlled with the preference primer*element_free_end_check.

- **Case 13273**

Added a new error check to trap an undefined parameter <ISNAN> on the CONTROL_SOLUTION card. This check can be switched on/off via preferences.

- **Case 13271**

Added a new check condition that will trap *CONTACT_ definitions containing master and slave sides with no entities. This check can be switched off or on by means of the preferences editor.

- **Case 12973**

Model checking will now warn if a model contains items of optionally labelled type, when some are explicitly labelled and some are not. Such modelling practice can cause problems with processing LSDA/Ascii output file data.

- **Case 12233**

Poisson's Ratio values computed from Shear and Bulk Moduli of materials are now flagged as errors if they are negative.

- **Case 11608**

Update/check definition of a section card for a shell part which has the _THICKNESS option set on any of the shells, will give a warning that the section gauge will be over-ridden. This warning may be switched off by the pref setting 'shell_thickness_check' which is on by default.

- **Case 11146**

If a rigidwall incurs a node error, e.g. 'nodes found behind or inside wall' or 'nodes on rigid parts impact geometric wall', the nodes themselves may be found by using the 'nodes->set' dropdown on the error check tree.

- **Case 10684**

During the key-in process, if elements with negative volumes or areas are encountered, Primer now offers the user the opportunity to group them into newly created element sets by element types, thereby allowing him to fix the element topologies manually.

- **Case 10658**

New model check to identify beams with one of their nodes suspended freely in space.

- **Case 8828**

A new error check has been added to ensure that when is set to -1.0, all parts on the master and slave sides have option _CONTACT set.

- **Case 3996**

Information about element quality for parts can now optionally be written to the summary file.

Clipboard

- **Case 14484**

When 'find referenced items' is used on the clipboard, Primer will now include any connection (and it's contents) where all the layers of the connection are also included.

Coating

- **Case 15290**

In the Coat->Face manu a new option has been added to coat only unblanked elements.

- **Case 14607**

The 'Coat' function now includes options for coating internal faces in the 'Face' mode with 'Propagate' turned on. These options were previously available in other modes.

Comments

- **Case 13305**

Editing comments for include files, items in edit panels and items in keyword editors is now non-blocking (i.e. user can carry on using Primer while the text editor is open)

- **Case 11718**

Primer now has an option (on the keyword pre-output panel) to output the acronym names of data fields in a comment line above each line of data.

This has been implemented for the majority of commonly used keywords.

- **Case 6007**

Primer will now read and store comments embedded within keyword data.

The following actions are available for these comments:

- They can (and will by default) be written out again in the same place during keyout.

- In both scalar editing panels and the keyword editor a new TEXT_EDIT function will write out a 'snippet' keyword deck containing just the item(s) being edited, including any comments. Comments may be added, removed or edited and then read back in to update the stored definition.

- In these editing panels hover-text is used to show any comments associated with a keyword.

Compare

- **Case 12440**

Model modified has been enhanced so that

- Differences are displayed by category (and optionally by include) in a tree type structure and can be interrogated by the user when model vs model comparison is done.

- Part properties (those available on the table) can be compared across models or within a single model for the case of 2 parts.

- Part geometries can be compared with a contour plot of the difference.

- **Case 10822**

A tree type display has been developed for viewing what has been modified in a model. This works best when both models are in memory and model vs model comparison is made. Drop-downs from the tree allow interrogation, edit, sketch, only, copy, deletion and other features to be applied.

In addition to keyword testing, the comparison will test all properties supported by the part table for all parts that can be matched across models. These may be viewed on the part table in a special mode that has been developed to support this feature.

A further (optional) check is available which compares the geometries of corresponding parts.

Connections

- **Case 16512**

Primer connection data can now be written as IGES files.

- **Case 16369**

Spotweld connections can now be created from geometry points (read from IGES file).

- **Case 16290**

A new check option (check > options > spotweld) and pref setting 'automatically_create_connections_from_welds' has been added. By default this is ON and means that Primer will make connections for all MAT100 welds on entering the connections function and before operations such as checking & deletion. The user may now at his discretion set the option to OFF to inhibit the creation of connections and accept a reduced level of connection management.

- **Case 15999**

Added an option to allow spotwelds/adhesive to be made on a clinch where meshed together elements of different parts form the clinch.

- **Case 15704**

Connection contact may now be fixed on a per connection basis as an alternative to the original per weld part basis. If the former method is used the contact is automatically switched to a node set definition.

- **Case 15672**

Added the ability to increase the number of lines displayed during a spotweld file read or custom spotweld file read.

- **Case 15484**

In order to create connection entities for solid MAT100 spotwelds, Primer requires that the topology is well conditioned, i.e. that nodes 1-4 lies on one layer and nodes 5-8 on another. Previously if topology was ill-conditioned, Primer would refuse to make the connection or (for 2T case) make it with incorrect layer definition.

Primer now offers the user the option to correct the solid topology so that connections can be made.

- **Case 15350**

Beam bolts can only be created between two layers. If on the create panel the user has selected >2 parts, he is directed to the table so the layer disposition can be set.

- **Case 15246**

If an Element_beam_pid definition which applies to a connection beam is modified in such way that makes it inconsistent with the layer definition of the connection, Primer will mark connection as invalid. For example if layer1=P100, layer2=P101 but element_beam_pid1=101, element_beam_pid2=100, the connection will be considered inconsistent.

- **Case 15166**

You can now modify the X, Y or Z coordinate of multiple connections on the connections table.

- **Case 14865**

The number of warning you can get during an autoweld process is now limited to avoid lots of streaming error messages.

- **Case 14747**

CONX_ACTION buttons have been added to the ELEMENT_BEAM deletion panel to give the user more control over connection data when deleting beams.

- **Case 14534**

More functions such as 'Delete conx' and 'Sketch FE' have been added to the right click popup on the connections table.

- **Case 14161**

The ability to write the connections table as a CSV file has been added.

- **Case 14135**

The beam and solid ids for a connection can now be displayed in a column called 'FE info' on the connections table.

The full listing of all connection entities is available from 'List FE' on the drop-down from an entry on the 'FE incl' column.

- **Case 12756**

MIG weld lines can be remade along a new edge mesh using the 'spotweld lines' feature. This also works when using part replace. You can also now select a MIG

weld 'line' through the connections table (selects all MIG welds associated through a line to currently selected welds).

- **Case 12108**

It is now possible to only display selected items on the connections table. This can be used in conjunction with the 'Select' button, with all the filtering options included in the object menu. For example, you can open the table containing all spotwelds, click on 'Select' and use filter to select only the ones with 3 layers, and then click on 'Show sel' to only show on the table those spotwelds with 3 layers.

Contacts

- **Case 15167**

CONTACT_1D and CONTACT_2D can now be created as well as edited in Primer.

- **Case 13660**

Checking and display of penetrations arising from beam-beam contacts is now supported for CONTACT_AUTOMATIC_GENERAL.

- **Case 8430**

'Sketch' and 'Only' options have been added to the contact editing panel. In the case of contact by segment or nodes, the only operation will apply to the underlying elements.

'Only' is also available as a function on the Contact panel and may be applied in contents mode (to work as above) or to only the contact itself.

Also, to see what constitutes the slave and master in a contact, a colouring scheme is available which plots slave in green and master in red. This colouring option is available under Display->Colour->Contacts.

Contour

- **Case 17203**

When contouring element formulation, Primer will now consider *CONTROL_IMPLICIT_EIGENVALUE settings.

- **Case 15096**

You can now plot plastic strain on the *INITIAL_STRESS_SHELL card by integration point, and also plot max and min values.

- **Case 14306**

Initial velocity vector components and magnitudes of initial velocity vectors can now be contoured in the CT/SI mode.

- **Case 12354**

Various element quality metrics, as well as an overall quality value, can now be contoured in Primer.

Cut section

- **Case 16509**

If a cut section is active then it is possible that when a new model is read in it will be clipped out entirely and not visible if it does not intersect the cutting plane, or

lie on a visible side of it.

This is correct, but it can be disconcerting since it appears that something has gone wrong with the graphics or that the model has not read in correctly.

Therefore PRIMER now checks to see if a newly read model is totally clipped out by an active cutting plane, and it is then it issues a warning and offers to turn the plane off, or move the plane origin to the centroid (centre of the bounding box) of the model.

The user is free to take either action, or to take no action at all and sort the problem out manually.

- **Case 15970**

If a *DATABASE_CROSS_SECTION definition has a title it is now displayed in the object menu and when annotating cross sections.

- **Case 12152**

Annotate (draw multiple cross-sections with their ID/title) and Display (draw one cross-section, unblanking only the parts in the referenced part set) buttons have been added to the *DATABASE_CROSS_SECTION editor.

- **Case 10870**

A new 'properties' option and sub-panel has been added to the cut-section menu.

This displays the cut-section in its local XY plane, and also calculates and shows the following section properties from cut solid, shell, thick shell and beam elements:

- Elastic properties: Area, 2nd moments of area (inertias), centroid.
- Plastic properties: Equal area axes, plastic moduli

It also calculates the following section capacities:

- '1st yield' capacity: The axial force and moments the section can carry at the point when the first element reaches yield. This is effectively the full elastic capacity.

- 'Fully plastic' capacity: The axial force and moments when all elements are at yield. This assumes 'elastic / perfectly plastic' behaviour and does not take into account any post-yield plastic characteristics defined on the material cards.

Both elastic and plastic section capacity calculations rely on yield stress and Young's modulus (E) being available from the material definitions of the cut elements.

Deleting

- **Case 16745**

Groups now have a 'lock' switch which protects the group contents against clean-up.

- **Case 15669**

It is now possible to cut out and replace an include file by deleting its contents and reading a new file (or rereading the existing file which has been edited externally). This functionality appears as a 'Replace' option in the include file tree.

This process requires the ability to delete items forcibly, meaning anything that is 'locked' by something else still gets deleted and is replaced by a latent definition. So 'Forcible deletion' is now available as an option in the Remove, Delete panel.

Dummies

- **Case 16367**

Command line input has been added for Dyna-method dummy positioning.

- **Case 14630**

A 'pick node' option has been added to the dummy positioning panel to set the H-point.

- **Case 9609**

A 'Dyna dummy positioning' feature has been added to Primer. This allows the user to set up a Dyna analysis that will pull a dummy into its desired position. This method means that deformations that occur during positioning can be incorporated into the dummy model.

Elements

- **Case 10977**

Creation of accelerometers will now by default create a rigid body for the 3 nodes if they are on deformable elements. This is done, on update, by creating or modifying a *CONSTRAINED_NODAL_RIGID_BODY or by creating *CONSTRAINED_EXTRA_NODES as necessary.

Formfx

- **Case 11843**

The FormFX tool now allows the selective mapping of the following data from the forming model to the crash model:

Initial stress tensors, initial strain tensors, plastic strain and shell thickness.

- **Case 4112**

Primer can now map forming data on to parts in the crash model that are mirror images of the parts in the forming model.

- **Case 4039**

Nodes lying on the forming model and the crash models can now be picked easily from the graphics window in quick succession. The re-designed panel allows the picking of nodes in a manner similar to that in the ORIENT -> TRANS-ROT tool.

- **Case 4037**

The FormFX tool now allows the selection of multiple parts for mapping data between the forming and the crash models. The panel has also been re-designed to make it more intuitive.

Geometry

- **Case 14187**

IGES line data can now be visualised in Primer

- **Case 13308**

IGES CAD files can now be read into Primer

Graphics

- **Case 16717**

When drawing SET_GENERAL, if BOX or DBOX is set, Primer will now draw the boxes referenced.

- **Case 15963**

PRIMER now has a capability to limit the number of labels drawn on the screen if labels for a large category are turned on in the Entity panel.

The user can choose whether not to apply this, setting the maximum number of labels to be drawn; the aim being to avoid the problem of graphics becoming both slow and unreadable as a massive quantity of labels are drawn on the plot.

- **Case 15655**

The length of triads or lines representing local X can now be controlled using options and can be specified in terms of either screen space or model space

- **Case 15138**

*DATABASE_CROSS_SECTION, *DATABASE_HISTORY_NODE_ID and other entity types may be drawn with their titles/names. These are switched on in the Entity menu.

- **Case 15093**

Some aspects of blanking and graphics have been threaded (parallelised) on multi-core machines so that the response to changes in what is visible on the plot are faster.

This mainly affects the response to blanking, but redraws following any change to what is visible, for example 'entity' switch changes, will also be faster.

Testing suggests that twin core machines are about 10 - 15% faster, and more recent four core machines are responding about 40% faster.

- **Case 15075**

Historically PRIMER has offered the following plot overlay modes:

No overlay
Free edges
Feature lines
All edges.

The 'free edges' option generates a line wherever an edge is unique to a single element or, the subject of this case, where it is on two elements but they are of different parts.

This means that if free edge mode is being used to detect 'cracks' in the mesh it is difficult to tell whether a line is being drawn because of a genuine mesh discontinuity or because it is on the border of two parts.

Therefore the free edge options have been extended to become:

Free edges (ignore parts) which does *not* draw lines at part boundaries.

and

Free edges (include parts) the original, and default, behaviour which *does* still draw lines on part boundaries.

- **Case 14786**

The joint annotate feature has been improved by adding the joint label, type and name to the annotation.

- **Case 14485**

Models with very short beams, ie beam spotwelds, were being drawn with a 'sphere' symbol that was overly complex for its small size. These symbols have been replaced with a simple point (blob) when very small, giving a dramatic speed-up during rendering.

- **Case 13941**

PRIMER has been criticised for mapping 'floating' menu panels in front of the graphics window in what appear to be random locations.

In fact positioning is not random, although the algorithm used to position panels is quite crude and does not make the best use of screen space, especially on wide-screen displays.

To tackle this problem a new 'Panel Behaviour' menu has been added under 'Options', giving more control over where floating menu panels are located on the screen. They can be cascaded down an edge of the user's choice, and existing panels may optionally be iconised when new ones are mapped.

The existing behaviour remains the default, but the new settings may be captured automatically in the user's oa_pref file, and will then become the default for that user.

- **Case 13525**

Version 10.0 of PRIMER can now display the names of items as well as their labels in the graphics window. The Entities menu now contains a 3rd column that can be used to turn on and off the display of names for all the item types that you can currently define a name for in LS-DYNA. The display of the item names is independent of the item labels and both of them can be displayed at the same time if selected.

The dynamic labelling option has also been modified so that it now contains an option to display the name as well as the ID of any items that are picked.

- **Case 13377**

An arrow is now drawn at the CofG of a LOAD_RIGID_BODY definition.

- **Case 12728**

Version 10.0 of PRIMER can now display the names of items as well as their labels in the graphics window. The Entities menu now contains a 3rd column that can be used to turn on and off the display of names for all the item types that you can currently define a name for in LS-DYNA. The display of the item names is independent of the item labels and both of them can be displayed at the same time if selected.

The dynamic labelling option has also been modified so that it now contains an option to display the name as well as the ID of any items that are picked.

- **Case 12426**

The colour of contact surfaces in Primer has historically used the default colour palette based on label (1 - red, 2 - green, etc); however when a contact is sketched from an editing panel the slave side is drawn in green and the master in red, which makes it easier to tell which side is which.

The option of using this green/red slave/master colour scheme has been added for 'normal' drawing of contacts, and may be invoked as follows:

- As a default for all contacts via the 'Colour' panel.
- For selected contacts via a Quick Pick or Part tree 'Colour' popup.

It may also be set as the default by using the preference:

primer*contact_colour: by_side

(Other choices for colour in the preference are an explicit colour, eg 'red', or 'default' to give the standard range of colours by label.)

- **Case 8431**

An ONLY function has been added to the contact editing panel which enables user to display just the contents of the contact or the underlying elements in the case of segment based contact.

- **Case 3741**

The sketch function in Primer has been enhanced to plot cross-hairs on the sketched item, set CN automatically, label the item and label its nodes when zoom is sufficient.

This applies only when a single item is sketched. See Display > Sketch Options.

Additionally there is a new FIND tool which offers further options.

Groups

- **Case 14037**

Primer will now read group visual properties which are either stored in the post *END group data or in an ascii group file written from Primer or D3Plot. It will read group colour, group transparency, group plotting mode and group blanking status. Primer will also write this data to the post *END group data or an ascii group file if all the part-based elements in the group have matching visual properties.

Ipp

- **Case 15493**

The min/max length of rod (and other dimensions) are now configurable under a settings option for the IPP impactor. Additionally, a maximum distance contact point to target can be specified and any positions outside this will be rejected.

Include

- **Case 15421**

It is now possible to rename an include file in the part tree and include tree

- **Case 14575**

The include tree now shows the include file labels as well as names.

- **Case 14002**

When using the include tree to add a new include file to the model, the file you are adding can now itself contain *INCLUDE or *INCLUDE_TRANSFORM cards.

This applies to both
'Add new child'->*INCLUDE and
'Add new child'->*INCLUDE_TRANSFORM

Include transform

- **Case 15584**

*DEFINE_TRANSFORMATIONs can be created by picking nodes, e.g. the 6 points required for POS6P option.

Installation

- **Case 17099**

In V94 the concept of an optional 'timeouts' file was introduced, which would automatically kill an application (after a warning and grace period) if it had been idle for a defined period. This file was looked for in the OA_ADMIN_xx directory only.

In release 10 the functionality of the 'timeouts' file is unchanged, but it is now searched for in OA_ADMIN_xx and then OA_INSTALL, in that order, and the first instance found is used, ignoring any subsequent definition.

This is to provide extra flexibility in installation, while still preserving backwards compatibility of functionality.

Keyword

- **Case 16702**

Support for the eigenvector output flag on *CONTROL_IMPLICIT_EIGENVALUE has been added to Primer (row 2 field 6).

- **Case 15930**

You are now able to edit NPR data on the *CONSTRAINED_GENERALISED_WELD edit panel.

- **Case 15583**

Added the ability to create multiple *INITIAL_STRESS_SHELL/SOLID/BEAM cards in the keyword editor.

- **Case 15302**

*DEFINE_VECTOR editing panel now permits quick-picking of a pair of nodes for tail and head coordinate specification.

- **Case 15292**

COORD field in *LOAD_VOLUME_LOSS card, now has drop-down list. COORD field is written out for LS971 R5 and above, while for versions below than LS971 R5 a warning is printed on window and blank field is written in .key file.

- **Case 15274**

*SECTION_POINT_SOURCE: Two more rows for orifice nodes are added to the editing panel to allow users to keep track of five orifice node rows at a time.

- **Case 14984**

Intial velocity fields VX, VY and VZ are made available in *INITIAL_VOLUME_FRACTION_GEOMETRY card.

- **Case 13714**

Primer now includes an editing panel for *LOAD_THERMAL_VARIABLE_BEAM

- **Case 13375**

When creating or modifying materials, it is now possible to sort the list of material types by alphabetical order.

Kwd editor

- **Case 16633**

Text popups are now available for editing char string fields in the *SENSOR keyword editor

- **Case 16079**

The 'Options...' button in the keyword editor's top row is used to select rows and perform other operations, but this is not obvious to a new user of the panel.

Therefore it has:

- Been changed to white text on a blue background to make it stand out

- Modified so that both a left mouse click (original behaviour) and a right mouse click (new) will invoke its associated popup menu, with the latter being made more obvious by the 'v' symbol on the button.

- Hover text giving a brief explanation of its function has also been added.

- **Case 15698**

The keyword editor can now be displayed without its 'Entry' row, which is useful when it is used to display information rather than in a context where manual editing and data insertion are likely to take place.

It is also now possible for two keyword editors to compare data fields and to highlight any that are different. This is used in functions such as 'Model Modified' to highlight the details of the differences between models.

In addition configuration parameters have been added to control how many rows of data the keyword editor shows when initially mapped. These can be controlled from Options > Panel behaviour, and saved in the oa_pref file.

- **Case 14546**

A 'Keyword editor' capability for *SECTION has been added.

There are a couple of unusual features about this editor:

(1) All *SECTION types (BEAM, SHELL, etc) share a common label range, so normally the type would be a keyword suffix within the editor.

However this would make its layout very complex and difficult to read, because most models contain multiple element types and consequently each data field could have many different meanings. Therefore each element type is displayed separately with the user choosing which to display via a radio button set.

This has the side-effect that it is not possible to change (say) a SECTION_BEAM to a SECTION_SHELL, but in practice it is difficult to see why there should ever be a need for this.

(2) SECTION_BEAM has quite a complex layout, with the meaning of data fields varying according to the element formulation (ELFORM) in use.

If all possible formulations were displayed simultaneously then the editor panel would be complex, contain excess rows for most cases, and be difficult to use. Examination of the LS-DYNA keyword manual for the *SECTION_BEAM card will illustrate the problem.

Therefore ELFORM has been treated as a 'pseudo' sub-keyword suffix for the SECTION_BEAM case, meaning that the editor panel filtering logic shows only the data fields appropriate to the subset of element formulations currently in use. Most models will only use 2 or 3 (of the 12 possible at the time of writing) types, resulting in a reasonably simple display.

Local axes

- **Case 13489**

Users can now opt to display triads using appropriate material colours for different layers of composite parts.

Macro

- **Case 14689**

Macros can now contain variables to make them more flexible.

- **Case 14572**

A new macro command 'Justify' has been added to enable the position of the Pause box to be controlled when mapped

- **Case 14571**

If a macro fails the line number that did not play is now reported in the dialogue box.

- **Case 14398**

Macro Pause commands can now contain unicode (e.g. Japanese or Chinese) text. The macro file must be in utf-8 encoding for this to work.

- **Case 14357**

Drag and drop operations in the part tree cannot be recorded to a macro. A warning message has been added advising that the user should use right click 'Cut parts' and 'Paste parts' instead.

Mass

- **Case 15507**

A new tool called 'Mass Prop' has been added which allows user to calculate mass properties of an arbitrary selection of FE entities.

- **Case 13406**

Assign mass function in primer can now work directly using contents of a part set or of an assembly (identified by name). This removes the previous requirement to make a group of parts to be massed.

- **Case 11965**

In Primer10, if added mass column is displayed, mass properties (CofG, Inertia) will be calculated with inclusion of any timestep added mass on deformable elements.

Materials

- **Case 16972**

The number of optional cards has been increased from 6 to 12 for MAT type 77_O and 77_H.

- **Case 16773**

Various material field units have been updated.

- **Case 16634**

MAT_SPOTWELD_DAMAGE-FAILURE: TRUE_T field is made available for OPT=-1 also. Now this field is available for OPT = -2, -1, 0, 1 and 7.

- **Case 15101**

When importing materials through the material database feature, any loadcurves associated with the material will now be labelled according to any include numbering range set.

Mechanism

- **Case 14634**

The Mechanism and Dummy 'position' menus now show the outline and title of the mechanism assembly under the cursor as it is hovered over them while positioning.

This is an extension of 'predictive picking', and can be controlled in the same way by the global 'pick and selection' option.

- **Case 14629**

The Mechanism joint capability in Primer has been enhanced to permit the connection points used by joints to be defined by explicit coordinates as well as nodes. (Previously only nodes were permitted.)

A joint can use any permutation of nodes and coordinates, and various means of defining coordinates are provided, including 'find centre of hole in mesh', 'average coordinate of a list of nodes', 'centroid of a part', etc.

As a consequence the *CONNECTION keywords (in *MECHANISM after main deck *END) have been extended. This extension is backwards compatible, so Primer V10 will read decks from an earlier version, but not forwards compatible.

- **Case 12659**

A mechanism line joint can now have an optional third assembly that is forced to slide a user-defined fraction of the sliding distance of Assembly 2 along the joint. This could apply, for example, to roller bearings in seat rails.

- **Case 11761**

Mechanism connection: movement can be specified by typing in slide distance or angle.

- **Case 11486**

The ability to colour parts by mechanism assembly number has been added to the mechanism positioning panel.

This is optional, and the user can toggle back and forth between assembly colours and default (part-based) ones at will. Also if this mode is chosen then colours revert to their default on exit from the positioner panel.

Merge

- **Case 15415**

During a model merge, you can now select the destination include file of the slave items in the master model. This can also be set when merging clipboard contents into a model.

- **Case 13290**

It is now possible to give a start label for relabelling items that clash. If it is too low it reverts to the previous behaviour with a warning.

Mesh

- **Case 15726**

Tria elements are now split along with quad elements when selecting to split multiple quads into four, if the tria is surrounded by split elements that will lead to mesh transition problems.

- **Case 15355**

If an undo was done in the meshing panel the PID textbox would be reset. It is now kept.

- **Case 12353**

It is now possible to create a hole in a mesh in Primer

- **Case 12159**

Some new tools for improving element quality are now available in Primer. Nodes can be dragged to improve quality. Alternatively, Primer can be instructed to automatically improve element quality.

Model modified

- **Case 16121**

When Model Modified compares the model in memory to the original version on disk it (obviously!) has to read it in again, and there are certain operations during the read process which can modify the deck during this second read meaning that comparison is not exactly with what is on disk. This can hide changes that PRIMER itself has made during its normal read process.

Therefore reversal of 2d/3d element topology to correct 'inside out' elements with negative area/volume, and the correction of 1D seatbelt element topology near sliprings have both been inhibited during the 'reread for comparison' process.

This should give a more accurate comparison between the model in memory and its original on disk.

Nastran

- **Case 16401**

A new option to 'Convert all RBE2s to CONSTRAINED NRB' has been added when reading a NASTRAN file. By default this option is unselected, so all 2 noded RBE2s with release codes 123456 are converted to CONSTRAINED_SPOTWELD, with the remaining ones converted to 2 noded CONSTRAINED_NODAL_RIGID_BODY.

If this option is selected all the 2 noded RBE2s, irrespective of their release code, are converted to CONSTRAINED_NODAL_RIGID_BODY.

- **Case 15567**

The Z0 field in a PCOMP NASTRAN card is now supported and converted to the NLOC field in *PART_COMPOSITE card.

- **Case 15440**

Primer now supports PLOAD, TEMP and FORCE NASTRAN cards.

PLOAD, TEMP and FORCE Nastran cards are treated as *LOAD_SHELL, *LOAD_THERMAL_CONSTANT_NODE and *LOAD_NODE cards respectively in Primer.

- **Case 13195**

Added a switch to enable the writing out of blank space instead of continuation strings in the NASTRAN output translator.

- **Case 11862**

Handling of the RBE2 Nastran card with one dependent node has been improved to retain the dependent DOF specified in RBE2. For this purpose, if the dependent DOF in RBE2 Nastran card with one dependent node is 123456, it is converted to *CONSTRAINED_SPOTWELD.

If the dependent DOF is anything other than 123456 in RBE2 Nastran card with one dependent node, then it is converted to *CONSTARINED_NODAL_RIGID_BODY with release codes set as per dependent DOF. RBE2 cards with more than one dependent nodes are always converted to *CONSTARINED_NODAL_RIGID_BODY.

- **Case 8761**

DOFs specified in RBE2 are read in and set as DRFLAG and RRFLAG in *CONSTRAINED_NODAL_RIGID_BODY. If there are chained RBE2s and dependent nodes have DOF other than the DOF of the independent node, then the DOF of the independent node is taken as the DOF for the chained RBE2s and a warning is displayed.

Orient

- **Case 17020**

Rotate by a given angle about an arbitrary axis has now been implemented for command line mode.

- **Case 16743**

You can now select include files to be oriented when using orient to contact on the command line.

- **Case 16587**

Orient by contact has been speeded up by adding an initial phase of bounding box to bounding box orientation before the potentially slow contact check phase is called. Additionally, the 'stop' button has been enabled.

- **Case 16116**

Copy & project and Copy & scale are now supported as orients.

- **Case 15427**

Orient and copy-orient now have the option 'move/copy welds with panels' which will be applied to welds when all the shells to which they connect are oriented.

- **Case 14499**

Orient using contact now allows selection of multiple parts against which to contact.

- **Case 13411**

When using the shell->offset feature, the shell offset is now consistent for the selected shells, even in the shell normals are not.

- **Case 10032**

On completion of copy-orient, the copy option is now de-activated. It was deemed safer to make the user activate copy each time rather than leave copy mode as active.

- **Case 8421**

The Orient menu now includes an object for projection of entities onto a surface or mesh comprised of shells, shell sets, or shell parts.

- **Case 4032**

Using the Orient > Drag node function, nodes can now be dragged either along attached shell planes, or along global or local X, Y, Z axes or XY, YZ, ZX planes. The impact of this movement on element quality can also be viewed in the form of contours.

Output

- **Case 16117**

Previously skipped data in a model (keywords which cannot be read) was written to the master file and a message about it would occur even when the user was keying out an unrelated include. Primer has now been corrected to write skipped data in the applicable include.

- **Case 16048**

If the values of SFA and SFO on *DEFINE_TABLE are zero, these are written (unconditionally) as blank instead of 0.0. This allows the model to run in versions of LS-Dyna which pre-date 971R5.

- **Case 15227**

There is now a 'Text edit' button on create/edit panels which will write the current definition to a mini-keyword file and open this in the user's preferred editor.

This can be used both to view/save keyword data, and also to add / edit comments on the keyword.

If the contents of the file are updated under the same filename, then the keyword definition in the editing panel reads this once the editor is closed and updates to reflect the new content.

(The same facility is available in the generic keyword editor.)

Parameter

- **Case 15272**

The LS-DYNA manual states explicitly that *PARAMETER names should not exceed 7 characters, however experience has shown that LS-DYNA will actually accept and process 8 character parameter names.

Since some input decks have been found to exploit this feature PRIMER has been modified to permit it, with the proviso that CHECK will issue a warning about

any 8 character parameter names encountered.

This check can be turned off by setting the preference:

primer*warn_param_8_chars: off

Part table

- **Case 17024**

A new column has been added to the part table show whether or not a material used by a part is encrypted or not.

- **Case 16982**

A new column 'Component mass' has been added to the part table. This represents the 'engineering' mass of a part. Broadly it is the sum of the structural mass, non-structural mass and nodal lumped mass. without transfer of nodal mass to nodal rigid bodies or transfer between merged rigid bodies.

The summation of this column should give the model mass.

- **Case 14482**

Added 'Select from table' under the part MID heading popup. Instead of the normal material object menu, this brings up an object menu just containing materials referenced by parts currently on the table

Part replace

- **Case 14146**

The ungainly information panel has been removed from part replace function and a conventional panel implemented.

Part tree

- **Case 16300**

An option has been added to allow the user to decide whether items referenced by a part (material, section, hourglass card and equation of state card) are moved to the new include file when moving a part to a new include file in the part tree.

- **Case 15037**

Options have been added to the part tree for blanking/unblanking/only of include files and assemblies. These operations can now be based on PARTS or ELEMENTS contained within the include/assembly (as there could be a mixture of both).

- **Case 14478**

ARROW UP, ARROW DOWN, PAGE UP, PAGE DOWN, HOME and END keys now all work with the part tree contents mode list panel.

- **Case 13530**

It is now possible to drag entities from one include file to another when the part tree is displayed in contents mode.

- **Case 13413**

The List menu in the Contents mode of the Primer Part Tree now includes a Find button.

- **Case 13404**

You can now add/remove and replace assembly contents to/from the clipboard by right clicking on an assembly in the part tree.

- **Case 12723**

The 'information' panel accessed through quick pick is now available through parts on the part tree.

Pedestrian

- **Case 4132**

A javascript has been written that will mark a vehicle according to the EuroNCAP or GTR specifications for pedestrian impacts. It is available in the primer_library\scripts folder where the Oasys Ltd. LS-DYNA environment software is installed.

Once the lines have been marked, csv files of impact points can be created for head, lower leg and upper leg impacts. These can be used in Primers automatic model build to create multiple models of different impact positions.

The lines are drawn using beam elements and can be saved as a separate model. A separate script is available that can convert the beams into IGES lines. This is also in the primer_library\scripts folder.

Penetrations

- **Case 16693**

The contact checker has been corrected to account for the setting Q2TRI on optional card D of contact. If this setting applies, two triangular segments are applied to a quad shell. This can change the penetration/crossed edge result when the shell is warped.

Preferences

- **Case 15682**

When you pressed dismiss or pressed the 'X' at the top right to dismiss the preferences menu a confirmation box was displayed asking you to confirm the exit. However if you did File->Exit it checked to see if there were any errors or if there were any changes that you had not saved and prompted you to save them.

The behaviour has now been changed so that both dismiss and file exit check for errors and unsaved preferences. Also, the logic for checking if a preference needed saving was sometimes not correct. This is now fixed.

- **Case 14608**

In the Preferences Editor, graphics overlay mode can now be set to one of: OFF, FREE, FEATURE or ALL. In addition, it is now also possible to specify the overlay line width in the Preference Editor.

Quick pick

- **Case 15417**

A request has been made to distinguish somehow in the ambiguous menu between picking a solid part and picking the part of the shells which coat it.

The introduction of predictive picking in V10 should make it easier to see which is which, and if an ambiguous pick is made it is now possible to hover over a menu row and see the relevant part highlighted. Since parts are highlighted using both their name and by drawing them with free edges it should be easy enough to tell which is which.

- **Case 13706**

The Quick Pick menu now has the type 'Include file' available, making it possible to blank etc by Include file.

Object menu selection generally also now has the ability to screen-pick include files.

Screen-picking is based on nodes, elements and drawable *constrained 'entities'; so include files that do not have any of these will not be screen-pickable. (However such a file probably won't be drawable either, so this limitation will not have much effect in practice.)

- **Case 12363**

A 'Key in' button has been added to the 'Quick pick' row at the top of the window, giving an alternative way of specifying the item(s) to be processed.

The syntax is identical to that used for 'Key in' in object menus, and the effect is exactly the same as screen-picking the item(s).

- **Case 12109**

The ability to 'LABEL' has been added to the 'quick pick' menu.

This will draw the labels of selected items on the plot, with additional information such as part id, material id, etc if requested.

- **Case 9410**

The ability to screen-pick include files has been added.

This capability will appear in all object menus where selection by include file is legal, and 'include file' is also now a valid type for the main 'quick pick' operation.

Include file picking is based on nodes, elements and selected 'entity' types (a few constrained items).

This is not an exhaustive list of what may be in an include file, meaning that if only 'non-structural' items are visible on the screen it is possible that the file may not be picked, however this is unlikely in practice. (This limitation is deliberate and exists to improve picking speed.)

- **Case 9251**

Historically the 'Q' short-cut key in PRIMER has made 'Quick pick' the current action for the mouse.

The behaviour has now been modified so that 'Q' now toggles between 'Quick pick' and whatever other action is or was at the top of the picking stack. This is best illustrated by example:

If you had selected Tools > Part > Modify PRIMER would change the cursor to 'Pick Part' to select the part to be modified.

Short-cut key 'Q' will now swap back to Quick pick, as previously, but a 2nd 'Q' will swap back to 'Pick part'. Subsequent 'Q's will toggle between these modes.

Read

- **Case 16574**

Through preferences or the model read options panel, you can now turn off the reading of HM and ANSA comments. The comments are used to create assemblies, set colours and in some cases set titles of keywords. There is also an option to turn on/off the setting of material and section titles to any available HM comment title, if the material/section does not already have a title.

- **Case 15723**

In the 'options' panel under Model Read some options have been added to 'read', 'skip' or 'ignore' keywords *BOUNDARY_xxx, *INITIAL_xxx and *LOAD_xxx.

'Read' is the default, meaning that these are read normally.

'Skip' does not read them into memory, but does copy them to the current skip file.

'Ignore' totally ignores them, with nothing being written to the skip file.

These options make it possible to ignore potentially voluminous data that is not needed or wanted when looking at the main parts of input decks.

- **Case 15418**

When reading a Keyword deck PRIMER reports the 2nd and subsequent occurrences of duplicate labelled definitions, and also multiple 'once only' (eg control card) definitions, giving their file and line number. However it has not historically also reported where the original (1st read) definition occurred. This can make it hard to track down duplication errors in input decks with many include files.

This has now been enhanced so that when a duplicate / multiple definition is encountered the include file (or master file) in which the first read definition was read is also given.

- **Case 12157**

A new preference setting has been added 'extensions_for_file_read_on_windows' which can be set to, for example, '.key;*.dyn' and files of both extension will be listed in the file selector panel. The setting is only applicable for windows.

Scripting

- **Case 17135**

Constant Colour.TEXT has been added to the colour class.

- **Case 17077**

Function Widget.PixelsPerUnit() has been added to help calculate a widget size in pixels. This may be useful for widgets with images.

- **Case 16792**

Create() and Edit() functions has been added to the Contact class.

- **Case 16725**

The *KEYWORD id, project, num and stage fields are now available as properties of the Model object.

- **Case 16697**

A new function Model.GetIncludeTransformOffsets() has been added to return offsets for a model to use in Model.ImportIncludeTransform() to guarantee no clashes.

- **Case 16696**

A new function File.DriveMapFilename(filename) [static function] has been added to do drive mappings between windows/unix in JavaScript

- **Case 16665**

A File.FindFiles() method has been added to the File class to find the files in a directory.

- **Case 16655**

Unix() and Windows() global methods have been added to allow the user to test what OS Primer is running on.

- **Case 16651**

Methods Model.ImportInclude() and Model.ImportIncludeTransform() have been added to JavaScript to enable an existing file to be added to a model as an include file.

- **Case 16649**

It is now possible to get and set IDNOFF, IDPOFF etc for an *INCLUDE_TRANSFORM using the Include class.

- **Case 16648**

A new function Include.Write() has been added which allows a single include file to be written.

- **Case 16645**

A File.Copy() method has been added to copy a file from a JavaScript.

- **Case 16636**

A new LoadBody class has been added to JavaScript to support the *LOAD_BODY keyword.

- **Case 16447**

More properties have been added to the Nrb and PrescribedMotion JavaScript classes.

- **Case 16364**

Support for control and database cards has been added to scripting

- **Case 16326**

The Conx class now has a length property to get/set bolt lengths. Additionally the available connection types have been updated to include the new 'bolt' connection types.

- **Case 16278**

The maximum length of text allowed for Widget.TEXTBOX has been increased to 256 characters (from 80)

- **Case 15882**

An Include.Select() function has been added.

- **Case 15788**

JavaScript support for *CONSTRAINED_GENERALIZED_WELD is added. This keyword can be accessed now using class 'GeneralizedWeld'.

- **Case 15787**

Added the _OFFSET flag as a new property of the JavaScript contact class. This allows the user to turn on/off the _OFFSET flag for contacts that support this.

- **Case 15621**

Javascript support for *INTEGRATION_BEAM and *INTEGARTION_SHELL keywords is now available. These can be accessed using class 'IntegrationBeam' and 'IntegrationShell' respectively.

- **Case 15383**

Support for creating, editing and accessing DEFINE_TABLE data has been added to JavaScript.

- **Case 15354**

A Transformation class has been added to enable *DEFINE_TRANSFORM cards to be created and modified.

- **Case 15247**

A simple function has been added to the contact handling capability of Javascript which will report the count of crossed edges found by Primer's contact checker.

- **Case 15235**

Added a function to return the bounding coordinates of a part.

- **Case 15228**

Added the ability to add hovertext to JavaScript widgets.

- **Case 14992**

Accelerometer class has been added to the Primer Javascript engine. This can be used to handle *ELEMENT_SEATBELT_ACCELEROMETER cards.

- **Case 14588**

A LoadShell class has been added to JavaScript

- **Case 14399**

Images can now be used on Widgets.

- **Case 14296**

If compilation of a script fails then the error is now printed in a message box as well as to the console window to make it more obvious what has gone wrong.

- **Case 14254**

It is now possible to run a JavaScript from another script by using the RunScript function

- **Case 14025**

Scripts can now be split up into separate 'include' files by using the Use() function.

- **Case 13961**

A Spotweld class has been added to JavaScript for access to *CONSTRAINED_SPOTWELD cards

- **Case 12991**

An Attached class has been added to the scripting to enable 'find attached' from a script.

- **Case 12990**

The JavaScript ModelMerge() function has been updated to allow the user to specify the type of merge and also to automatically merge nodes within a specified tolerance.

- **Case 12438**

Unicode support has been added to Widgets and Windows

- **Case 12435**

A new ComboBox widget has been added to JavaScript

- **Case 12051**

New functions have been added to Javascript contact class which support contact checking. <StatusCheck> returns a count of crossed edges and of penetrating/tied nodes for a contact. <PenCheck> flags the nodes which are penetrating/tied.

- **Case 11785**

Support for *DATABASE_BINARY, *DATABASE_EXTENT_BINARY, and *DATABASE (ASCII) has been added to scripting.

Seatsquash

- **Case 16064**

During dyna method seatsquash, Primer will automatically select 'foam' type parts in the seat to remain deformable. This can often be difficult to see on long object menus. A message has been added to the panel informing you how many parts have been pre-selected (if any have been).

- **Case 15412**

An option has been added to the Primer method of seatsquash so that the solid foam of the seat does not have to be specified. This allows the user to just deform the outer shells of the seat foam so the foam solids can be meshed post-squash. This option has also been added to the command line version of Primer seatsquash.

- **Case 14628**

Support of *INITIAL_FOAM_REFERENCE_GEOMETRY has been added to the seatsquash function. Primer will now do the following?

PRIMER METHOD

1) Primer will give you the option to create the reference geometry cards

automatically during seatsquash.

2) The option is only available if the solids you have chosen to be squashed are 'valid' for the initial foam ref geom keyword (hyperelastic material and certain solid element formulations).

3) Primer will automatically set the REF field on the material card.

IMPORT OF DYNAIN FILE

1) Primer will give you the option to create the reference geometry cards automatically during the import.

2) You can choose to import INITIAL_STRESS_SOLID information from the dynain file, OR create the INITIAL_FOAM_REF_GEOM cards - you cannot do both.

3) Again, the option is only available if the solids you have chosen to be squashed are 'valid' for the initial foam ref geom keyword (hyperelastic material and certain solid element formulations).

4) Primer will automatically set the REF field on the material card

The ability to create INITIAL_FOAM_REF_GEOM automatically has also been added to command line seatsquash functionality

Selection

- **Case 15425**

It is now possible to sort the order of object menus by clicking on their title bar.

By default Primer generates these menus in its own internal order, which is usually by item label. Clicking on the title bar cycles through the alternatives:

A-Z Sort titles alphabetically
Z-A Inverse of A-Z
0-9 Sort labels numerically
9-0 Inverse of 9-0
Orig return to original sort order.

Alphabetical sorting initially looks at title strings, but if the items do not have any defined it reverts to the full menu row. If a mixture of titled and untitled items are found those with titles will always appears at the top of the list.

- **Case 14869**

Multiple selection during creation in the keyword editor is now available for *INITIAL_STRESS_DEPTH and *INITIAL_PWP_DEPTH

- **Case 14483**

When selecting 'VIS'ible items in object menus one option is 'All visible'.

Historically this has been programmed to mean everything in the current view as clipped by the window, the equivalent of dragging out a rectangle of the whole

window.

However this was not what was intended: it should have selected everything currently drawn, whether visible in the current window at the current scale or not.

It has been corrected to do this, and 'All Vis' now selects everything that would be chosen were you to:

+ Autoscale the model
+ Drag out a screen area that encompasses the whole screen.

- **Case 13410**

Various improvements have been made to picking and selection:

By default Primer now shows the item under the cursor by highlighting and labelling it. This is referred to as 'predictive picking', and it can be turned on/off, and also restricted to just highlighting.

If ambiguous selection is enabled, and the current cursor position would result in an ambiguous pick, then predictive picking makes a distinction between the nearest (yellow) and others (white) - or complimentary colours if background is white - so that it is not necessary to perform a pick to see the closest. Also if predictive labelling is active, the default, then only the closest item is labelled.

If you do perform an ambiguous pick then it is now possible to identify menu items by hovering over them, as this highlights and labels them on the screen. Again the closest drawn in yellow, and the rest in white.

This 'hover over menu item' logic now extends to any object menu: hovering over the row of a pickable item will highlight and label it on the screen.

All aspects of predictive picking and 'hover over menu' are controllable via the new 'Picking and selection' panel invoked from the main Options pull-down menu.

- **Case 5907**

When using Object Menus it is now possible to filter the menu contents by text string.

This is done by entering a string to match, which may contain the wild-cards '*' for multiple characters, and '?' for a single character, into the Text Filter button at the top of the Filter menu.

Matching is performed against object title / name only, ignoring any label or model number prefix.

Shortcut

- **Case 15262**

A shortcut 'k' has been added which resets all entity visibilities to what they were at start up.

Sketch

- **Case 16006**

The ability to sketch SPR and SPR2 definitions has been added.

- **Case 15668**

A preference has been added for setting the sketch colour within Primer.

Units

- **Case 16787**

Fourth field (LCLD) in Card 2 for *MAT_183 is updated to LC/TBID as per new LS-DYNA manual, which resolves the issue of units not getting updated for this field.

User interface

- **Case 15684**

There have been requests that the number of lines 'remembered' by the Dialogue box should be increased from the present limit of 200, so that the user can scroll back further and view earlier output history.

This would be possible, for example the limit could be raised to 5000 lines, but the result would be ergonomically poor since scrolling many lines through a small window is not generally satisfactory.

So instead the Dialogue window now automatically saves all its input in a temporary scratch file, and this can be viewed in a system editor at any time by using a new 'Edit text history' option that is invoked from the [-] popup menu at the window's top left corner.

Using an editor is much more flexible as the results can be saved to other files, edited, and so on. Also there is no limit (other than disk space) to how many lines of data can be saved.

- **Case 14853**

On drop down menus the following additional functions are now available

CLIP ADD, CLIP REM, CLIP REPLACE

and

BLANK, UNBLANK, ONLY (for sketchable items)

- **Case 14631**

Titles in editing panels show 'no title defined' if the original item has not been given a title, and historically this string has to be removed out by the user in order to define a new title.

Primer now recognises this as a special case, and clicking in the title box where such a message is displayed will automatically remove the message, so that the new title can be entered immediately.

- **Case 11290**

Axes of rotation in the *INITIAL_VELOCITY_GENERATION editing panel can now be defined quickly by selecting two nodes.

The *DEFINE_TRANSFORMATION editing panel has been enhanced to allow the definition of transformation distances, points, etc. by selection of one or two nodes in the model.

Write

- **Case 17186**

A preference has been added to suppress writing item 'referenced, but not explicitly defined' warning messages to a model upon keyout.

- **Case 15429**

A new keyout option for include files has been added. This will write all includes to the same directory as the master file.

- **Case 14494**

The output panel now displays the (root) name of the sub-directory to which includes will be written and allows the user to edit it.

3.2 D3PLOT

3.2.1 Enhancements in 10.1

Two enhancements have been added to D3PLOT 10.1.

Movies

On Windows and Linux (but not Unix), D3PLOT 10.1 has been built with a third party library (FFmpeg version 0.8) which is now used to decode a wider range of movie formats.

In previous releases the formats that D3PLOT could read on Windows was limited to the codecs that were available on the system. On Linux it could only read formats that D3PLOT could write. Using the FFmpeg library means that over 50 different formats can now be read.

D3PLOT 10.1 uses the following logic to find a codec for the format being read:

- Look for a codec on the system.
- Look for a codec in the FFmpeg library.
- Look for a simple codec hard-wired in D3PLOT.

Note that we have only tested a few of the formats supported by the FFmpeg library.

Femzip

A new standalone reader for Femzip is now used to decode models compressed using Femzip. D3PLOT will automatically find and use the new Femzip reader.

The standalone reader allows a separate process to be started for each Femzip model that is opened. For a single model the new reader should be faster than the reader in 10.0. For multiple models the standalone reader can be an order of magnitude faster.

3.2.2 Enhancements in 10

Attached

- **Case 15193**

A find attached function has been added into D3Plot, accessed through the tools button 'Attached'.

The function is similar to the one in Primer, but 'Attached' items are limited to those that share nodes.

Contour

- **Case 17083**

The number format on the external data contour bar (UTILITIES->EXTERNAL DATA) can now be controlled by setting the exponent and number of decimal places manually. This can be done both from the menu and in the external data text file with the variables:

cont_format <auto> or <manual>
cont_exp <exp>
cont_dp <dp>

- **Case 16488**

A button has been added in the Contours->Levels menu to convert the contour scale to a log-scale.

In addition a switch has been added so that exponents can be shown for each contour band value, rather than a single exponent at the bottom of the contour bar. This may be necessary for a log scale to show each value to the necessary precision.

- **Case 16113**

The dialogue command '/CONTOUR REVERSE' has been added so you can reverse the contour colours.

- **Case 15326**

A dialogue command has been added to allow the contour band colours to be set:

/CONTOUR COLOURS <band #> <colour>

- **Case 15233**

From version 10.0 onwards the symbol size used in principal stress/strain plots can be fixed so that all of the symbols are the same length instead of varying with the magnitude of the value. In all cases the colour of the symbol will still represent the magnitude of the value.

- **Case 15107**

External data plots can now display an arbitrary text string and the node id or coordinates where the data is positioned.

These can be turned on in the text file with the commands:

show_text true
show_nid true
show_coord true

The arbitrary string is limited to 80 characters and is written in the file at the end of the 'ndata' or 'data' lines, e.g.

ndata 1 100 text
data 10 10 10 100 'text with spaces'

If the text has spaces in then it needs to be enclosed by ' ' 's.

- **Case 15035**

Historically D3PLOT has taken a very conservative approach to rescanning automatic contours following a change to a data-bearing plot.

This can be quite slow for a large model, and two changes in V10.0 have improved this considerably:

+ The algorithm used to manage the internal results database has been modified so that more results are held in memory, therefore a rescan can now often take place from memory (fast) rather than requiring a reread from disk (slow).

+ Many causes of unnecessary contour rescans have been eliminated, so the process should not happen so often.

+ When cut-sections are active recomputation of max/min bands now only takes place for parts actually cut by the section which, again, speeds up the scan.

- **Case 14993**

The format of numbers on the contour bar can now be controlled by the user. The exponent value and number of decimal places to display can be set in Contours->Option (popup)->Number format.

Two preferences can be used to set the values:

d3plot*contour_exponent:
d3plot*contour_dec_places:

- **Case 12776**

If the Max/Min option is turned on, the data value can now be displayed on the plot as well as the label.

This is on by default, but can be turned off in the Max/Min menu.

Cut section

- **Case 16154**

When selecting cut sections in the dialogue command box, e.g.

/CUT GET <id>

the <id> previously had to be specified by the cut section number. It can now be specified by the name of the section as well.

- **Case 15454**

The command THICK_CUT has been added into the dialogue commands for cut sections to turn on/off the plane thickness.

To turn it on:

/CUT_SECTION THICK_CUT <thickness>

To turn it off:

/CUT_SECTION THICK_CUT OFF

The command CAPPING has also been added, to set whether 2D elements are capped.

To turn it off:

/CUT_SECTION CAPPING OFF

To set it to true thickness * <factor>

/CUT_SECTION CAPPING TRUE_THICKNESS <factor>

To set it to a fixed thickness value

/CUT_SECTION CAPPING FIXED_THICKNESS <value>

- **Case 15184**

'Basic space' cut sections are now rendered in 3D mode, completely removing any need to revert to 2D. Cut section display generally has also been speeded up generally in V10.

Basic space sections now take around 15% longer to compute than the deformed space equivalent because of the extra complexity of the calculations required.

Re-rendering times (eg dynamic viewing) are now much the same for deformed and basic space modes except when lighting has to be calculated, as the need to compute an individual normal for shading each element imposes a slight speed penalty. On machines with hardware shading there is no significant difference in speed between deformed and basic space rendering.

- **Case 15178**

Cut-section operations have been speeded up significantly, in particular dragging the section through the model should be faster.

- **Case 4528**

Cut Section Forces can now be written to a csv file.

Data access

- **Case 16543**

In version 10 of the Oasys Ltd. LS-DYNA environment software suite a 'ZTF' file created by PRIMER contains, among other things, the following material properties for all parts as computed by PRIMER.

Density
Young's modulus
Poisson's ratio
Yield stress
Failure strain

These are now available to plot as data components in D3PLOT (for parts) and may be used for part-based elements in user-defined components and in Javascript.

- **Case 16384**

In version 10.0 *DATABASE_CROSS_SECTION definitions can be viewed in D3PLOT (if you have a ZTF file created by PRIMER 10.0) and cross section forces and moments can be contoured via the 'OTHER' data menu on the cross sections if you have a LSDA (binout) file.

Deform

- **Case 15312**

When the 'Deform->Fix node' or 'Deform->Shift def' menus are selected, if nodes have not been set, they now automatically turn on the node picking mode.

- **Case 15206**

If Envelope plotting is turned on a relative plot of values between models is now possible.

- **Case 15190**

In response to various requests relating to the Fix Node, Shift deformed and Reference node panels the following changes and enhancements have been made:

There is now a [M..>] popup next to all node selection buttons in all of the fix node, ref node and shift result panels. This defaults to 'any', giving the existing 9.4 behaviour in which nodes can be picked from any model and will be applied by label to all other models in the window(s). If a specific model is chosen instead then selection is restricted to that model and will also only be applied to it, making it possible to select different nodes in different models.

There is now a 'show nodes' button in all these panels which, if turned on, causes display of the fixed / reference nodes and any associated triad to be shown for anything that is turned on. Nodes are labelled, with a model prefix if > 1 model in the database.

There is now a button on the Shift Deformed panel which shows the status of the Reference nodes ditto, and allows it to be turned on/off.

The contour bar now shows the reference node(s) separately for each model in a window.

If reference nodes are switched on and a displacement component is being displayed in the local axis system the component name is now prefixed by 'REF LOCAL'

General

- **Case 16423**

Selecting all visible entities on the command line could be achieved using the '%' command, e.g. to colour all visible parts blue:

/UT COL PART %
BLUE

This was not shown as an option in the help text in D3Plot, but now is.

An equivalent command 'AV', which does exactly the same thing, has been added to make it more obvious what it does, e.g. 'PART AV'.

- **Case 15461**

Dialogue commands have been added to turn on/off the display of max/min values.

/MAX_MIN <action>

- **Case 15460**

Dialogue commands have been added to turn on/off envelope plotting:

/ENVELOPE_PLOT COMPONENT <type>
/ENVELOPE_PLOT STATES <list>

Commands have also been added in the WRITE menu to do the same thing:

/WRITE ENVELOPE COMPONENT <type>
/WRITE ENVELOPE STATES <list>

Graphics

- **Case 15731**

When shift deformed is used the reference plane is now highlighted by drawing a triad showing the location and local axis.

- **Case 15526**

From version 10.0 onwards the failure time for any spotwelds can be displayed on top of the spotweld elements.

The option to turn on the display of the failure time is in the spotweld attributes menu.

- **Case 15208**

From version 10.0 onwards D3PLOT can now display the location of deformable and rigid connections using a new bolt symbol. PRIMER 10.0 in needed to generate a ZTF file with the location of the rigid and deformable (beam based) connections.

D3PLOT can also display a row of spotweld beams as a MIG line if PRIMER has been used to generate the line of welds and has generated a ZTF file.

- **Case 15204**

Version 10.0 of D3PLOT has a new 3D graticule option as well as the old 2D option. With the new 3D option 3 independent planes at constant X, Y and Z can be displayed. The size and location of each of these planes can be specified along with the grid size displayed on each plane. A transparency value can also be defined for the 3 planes so that the model can be viewed through the planes if required.

- **Case 15186**

The fonts of text in the graphics window can now be set by the user in the Display Options->Fonts menu.

The font size can be set individually for:

Labels
Title
Clock
Contour bar

Graticule

The font type can be set to:

Helvetica Medium
Helvetica Bold
Times Medium
Times Bold
Courier Medium
Courier Bold

and will apply to all the text in the graphics window.

Preferences are available to set the defaults.

- **Case 14513**

Graphics speed improvements have been made in the following areas:

+ Cut-section calculation and drawing have been speeded up considerably.

+ Dragging a cut-section through a model is now many times faster, both because of the changes above and because updating the cut plane and (for data bearing plots) automatic contour bands have now been turned off during dragging. (This is optional, and these can be turned back on again if required.)

+ Unnecessary recalculation of automatic contour bands has been reduced, and when cut-sections are active recalculation now only takes place for those items actually cut by the plane.

+ Much more use is now made of recent graphics hardware, and a new 'tuning' panel enables display speed to be optimised for a given piece of hardware. This tends to give speed improvements of at least 3x on modern machinery, and sometimes substantially more.

Groups

- **Case 14709**

When results are being read from a read-only file system problems can arise when groups are used, since D3PLOT normally builds a (binary) jobname.grp file in the results directory, and if this cannot be created it gives a warning message and stores this in a temporary directory instead.

Regardless of where it is stored this .grp file persists when a session ends so that groups created in one session can be reused in any future one. However when files are stored in a common temporary area this too can cause problems with file clashes.

Therefore two preferences have been added:

d3plot*group_file_location: <pathname>

Opens the .grp file in <pathname> instead of the default location.

d3plot*delete_group_file: <true | false>

Causes the .grp file to be deleted at the end of a session if true.

Image

- **Case 16327**

The dialogue command

/IMAGE WHITE_BACKGROUND ON/OFF

has been added to turn on or off the switch to capture an image with a white background.

- **Case 12400**

The repeat count for animated GIF files is now separate from that for AVIs, and its default is now zero meaning 'loop forever'.

In addition the following commands have been added to the command-line IMAGE command:

AGIF To write an animated GIF file
AG_REPEAT To set its repeat count.

(The behaviour of AVIs is unchanged, and their repeat count still defaults to 1 as most AVI players have an 'infinite loop' capability.)

Javascript

- **Case 16044**

When a Javascript creates User Defined Binary (UBIN) data components D3PLOT will write these to '.ubd' files on disk, in the same directory as the analysis from which their data was obtained.

This behaviour has caused problems for users whose data is presented to them in 'read only' directories, so the following options have been added:

(1) The javascript function CreateUbinComponent() now has two extra, optional arguments:

Dispose : May be either LEAVE or DELETE

Location : An optional pathname giving an alternative .ubd
file location, or alternatively IN_CORE to keep
the data fully in memory

These two arguments allow the script programmer to decide whether or not .ubd files should be written, where they should be written, and whether or not to delete them at model closure or D3PLOT exit.

(2) The default behaviour of LEAVE, and put the .ubd files in the same directory as the analysis, remains unchanged. However these defaults may now be modified

by the preferences:

d3plot*ubd_file_dispose: with the options LEAVE or DELETE

d3plot*ubd_file_location: with the options of a
or 'IN_CORE'

Labels

- **Case 15659**

From version 10.0 the dynamic labelling of elements can now display the Part Name as well as the Part ID.

If Parts are dynamically labelled a single label is now displayed at the centre of each part. This label can contain the Part ID, the Part Name or both.

A PARTS option has also been added to the entity panel. This option can be used to turn on the display of the Part ID's and Names. As with the dynamic labelling option a single label is produced at the centre of each Part.

- **Case 15277**

Version 10.0 of D3PLOT has been modified to try and stop it producing 000's of labels.

If a PART is selected for dynamic labelling in version 10.0 then a single part label is now generated at the centre of the part and all the elements that make up the part are highlighted.

There is also now a built in maximum number of labels that are displayed on a plot. By default this limit is set to 1000 but it can be changed with a new preference option

d3plot*max_labels:

The 1st time this limit is reached D3PLOT will display a warning message and offer the user the choice to do 2 things:

1) Ignore the limit and display all the labels in the future.
2) Change the limit to a different number.

Once this warning has been displayed it will not be repeated, but the user can always change the option he selected using some new buttons in the ENTITY menu.

As well as the 'd3plot*max_labels:' preference there is also a new

d3plot*label_warning:

preference that can be set to TRUE or FALSE. If this is set to FALSE then the warning message will never be displayed but the user defined limit will still be applied. Again the user can still change things in the entity panel.

- **Case 15192**

From version 10.0 onwards the Quick-Pick Dynamic labelling option now has an option to automatically add the Model prefix to items when they are labelled.

The Target Marker menu now contains an option to automatically add node labels to the nodes that have target markers.

A generic option to automatically label items as they are picked has also been added to version 10.0. This option can be turned on/off via a shortcut key (J be default) or it can be set via the drop down menu from the 'Options' button in the top bar.

Measure

- **Case 15200**

From version 10.0 onwards D3PLOT can keep track of up to 100 different measurements. Each measurement can be in a different window or between different models in the same window. The measurement menu only shows the details for a single measurement at a time but all the measurements can be displayed on the screen at the same time. The colour for the current measurement for which the details are being displayed can be set to a different colour to the rest of the measurements.

Once a measurement has been created it can now be seen visually on the screen along with the corresponding distance or angle. If the measurement uses nodes then the value will be automatically updated when the state changes.

In addition to displaying the measurement value the nodes used to create the measurement can now have their labels displayed. If the option to display the model number in dynamic labelling is turned on then the model number will also be added to the measurement node numbers.

Once a measurement has been created it can be modified or deleted as required.

Menus

- **Case 15398**

In previous versions of the Oasys Ltd. LS-DYNA environment suite the directory selector menu could not be resized on Windows. This has been fixed in 10.0 so the window can now be resized to show more directories and longer directory names.

Movies

- **Case 17085**

Historically D3PLOT decompressed all background animation movies into memory, and then displayed them from there. This was quick, but used a lot of memory.

It has now been modified to 'stream' background movies instead, decompressing each frame on the fly. This is slower, but not unacceptably so, and the option to use 'cached' images is still there, although it is no longer the default.

Multiple wdws

- **Case 14276**

From version 10.0 onwards D3PLOT can now read a new 'Template' file that can be used to control which models are loaded into which window and to define model offsets, colours etc within the window.

The template file is a simple ASCII file that has the following format

```
#
Window=1 model=1 offset=model x=0 y=0 z=0 mode=shaded colour=red
Window=1 model=2 offset=model x=100 y=0 z=0 mode=shaded colour=green
#
Window=2 model=1 offset=model x=0 y=0 z=0 mode=shaded colour=red
Window=2 model=3 offset=model x=100 y=0 z=0 mode=shaded colour=blue
#
```

This example puts models 1 & 2 in window 1 and models 1 & 3 in window 2. The full range of options are as follows

offset = DEFAULT, MODEL, SCREEN or OFF (DEFAULT=MODEL)
x/y/z = offset in model units, x=100% means offset in the x direction by 100% of the models x span
colour = DEFAULT, PART, red, green, blue... (DEFAULT=PART) or 0xRRGGBB specifies a RGB colour mix
mode = DEFAULT, SHADED, WIRE, HIDDEN or CURRENT (DEFAULT=CURRENT)

The template file can be read in

a) From the 'Open Model' panel before you read in models
b) At any time via a new 'Load Template' option in the Window drop down menu (you can also save a template out)
c) On the command line by adding '-tpl=template_filename'.

If you read in a template file that refers to models that are not currently loaded in D3PLOT then the template file settings are stored and applied when the model is eventually read in, so you can set up a template that positions all 32 models in window 1 if you want to and use that template with 1, 2 or n models.

New feature

- **Case 14832**

A Response Spectrum Analysis function has been added in the Utilities menu. This function is intended for use in a seismic analysis to combine the multiple modes of a structure into a single estimate of the total response.

The Square Root Sum of Squares (SRSS) and Complete Quadratic Combination (CQC) methods of superposition are available.

Orient

- **Case 15211**

A new 'Transform' option has been added to the 'Deform' menu.

This allows an arbitrary combination of translation, reflection, rotation and scale to be applied to a model, transforming it in space.

Transformations are applied to both geometry and data components.

Pages

- **Case 16347**

Dialogue commands have been added to control page layout, accessed through /LAYOUT.

Part tree

- **Case 15205**

Historically the 'Part tree' has treated PARTs as a special case always displaying them expanded at the top tree level.

For users working by something other than parts, eg by groups, this can be a nuisance when multiple models are present because it is necessary to scroll all the way down through all the parts in model #1 in order to get to the groups in model #2.

Therefore there is now an option to choose whether parts should be displayed 'expanded' at the top level, still the default for backwards compatibility, or treated as a category that can be expanded by the user if desired. If the latter method is chosen then parts are initially displayed as a single line of [+]--PART, which makes dealing with multiple models easier.

This behaviour can be set as default by a preference, and preferences to display all the other categories under the 'type' button have also been added.

- **Case 14827**

The 'part trees' in both PRIMER and D3PLOT have historically listed parts first, placing any extra types the user has selected below the parts.

This means that it is necessary to scroll down through all parts to find the list of (say) groups.

This behaviour has been modified so that if the user selects extra types to be shown these will always precede the listing of parts.

They will initially be displayed in compact form, requiring a click on the [+] button to expand them, so typically they add only 1 or 2 rows to the top of the part list in the tree, barely changing its appearance.

Preferences

- **Case 14704**

The preference 'shaded_type' has been added to set FLAT, SMOOTH or DITHERED shading.

Properties

- **Case 15979**

Dialogue commands have been added to read and write properties files:

/UTILITIES PROPERTIES_FILES READ <model_num> <filename>

and

/UTILITIES PROPERTIES_FILES WRITE <model_num> <filename>

- **Case 15063**

Dialogue commands have been added to set the visual properties of models. They can be accessed through the command '/PROPERTIES'.

Properties files can be saved and loaded and the display mode, colour, transparency, brightness, shininess, overlay colour and overlay mode can be set.

Quick pick

- **Case 16241**

'Trace' and 'Target Marker' have been added to the quick pick options.

- **Case 15524**

In version 10.0 of D3PLOT there is now a Quick-Pick 'Information' mode that will display some basic information about elements and parts. The data displayed includes

Include file
Part ID and name
Material ID, name and type
Young's Modulus
Poisson's ratio
Yield Stress
Failure Strain
Section ID, name and type
Initial shell thickness

- **Case 15194**

The Quick-Pick menu now has a 'Find' option which can be used to find the location of a part, node or element in a model. When an item is 'found' it is sketched in wireframe mode and a cross hair is drawn through the centre of the item. If a second item is 'found' then the first item remains sketched but the cross hair moves to the new item. The DELETE key clears any sketched items.

- **Case 15181**

Groups can now be selected via the quick pick menu.

Read

- **Case 15523**

When opening a model if the user selects job.'ext', D3Plot will now find and open job.ptf (or job.rlf) if it exists. 'ext' can be any file extension (e.g. .key, .ptf01, .ptf02 etc).

Scripting

- **Case 15968**

Version 10.0 of D3PLOT contains 2 new JavaScript functions

IsDeleted(type,id) Returns TRUE or FALSE.
'type' can only be NODE, SOLID, BEAM, SHELL, TSHELL or PART.
'ID' can be +ve (index) or -ve (label).

If PART is used then this function returns TRUE if all the elements in the PART are deleted, otherwise it returns FALSE

IsBlanked(type,id) Returns TRUE or FALSE.
'type' entity type
'ID' can be +ve (index) or -ve (label).

If PART is used then this function returns TRUE if all the elements in the PART are blanked, otherwise it returns FALSE

- **Case 15697**

In version 10.0 user defined data components can now be defined for spotwelds, springs and seatbelts. All of the LSDA data components can be used in simple formulae and Javascripts.

The D3PLOT Javascript interface now supports the following entity types,

CWLD : *CONSTRAINED_WELD spotwelds
GWLD : *CONSTRAINED_GENERALISED_WELD spotwelds
BWLD : Spotweld BEAMS
HWLD : Spotweld SOLIDS
HSWA : SOLID spotweld Assemblies
SPRING : Springs
SBELT : Seatbelts
RETR : Retractors
SLIP : Sliprings
PRET : Pretensioners

in the following functions

GetNumberOf( )
GetLabel( )
GetPid( )
GetMid( )
GetTopology( )
CreateUbinComponent( )

PutUbinData( )
GetUbinData( )
GetData( )

- **Case 11786**

The D3PLOT Javascript interface now contains the following new functions for picking and selecting items.

Select(<type>): Returns the number of items of <type> selected.
IsSelected(<type>,<item>): Returns TRUE/FALSE if an item has been selected, if <item> is +ve it is an index, if -ve an ID.

Pick(<type>,<number>): Prompts the user to pick 'number' of items and then returns an array containing those items. If 'number' is +ve then the internal index of each item is returned in the array, if 'number' is -ve then the items labels are returned.

Selection

- **Case 16455**

Predictive picking has been added to D3PLOT:

- For 'quick pick' and other menu-based picking the default is now to show what would be picked were you to click.

- This can be toggled on/off using the [PP] button at the top of the screen, or by the 'p' short-cut. (Quick pick and menu-based picking are controlled separately.)

- Hovering over a row in a menu of items to be selected will also now sketch the items in question. Again, this can be controlled.

- The use of the 'ambiguous' menu is now also switchable, and if used it too will show the item to be selected when the cursor is hovered over a menu row.

All these options may be initialised via preferences.

Shortcut

- **Case 15288**

A shortcut 'k' has been added which resets all entity visibilities to what they were at start up.

Speed

- **Case 15525**

It has been a criticism of the code that it runs slowly when multiple models are loaded. To some extent this is inevitable as more demands are made on memory, cpu and graphics, but a lot of changes have been made to try to improve matters:

- Remove redundant operations when dealing with multiple models in a window (e.g. blank in M1 does not require a visibility update pass in M2 and M3).

- The results database logic has been modified so that it is less parsimonious about storage, meaning that fewer rereads should be required. In effect it is allowed to

use memory more liberally, and only falls back to the 9.4 'Parsimonious' logic when overall memory usage reaches about 80% of RAM.

- Parallelised 'read ahead' of results in separate threads when reading data for an animation contour scan has been added. Each model family has a separate thread so, depending on where the files are on disk, this can make a significant difference to the time required to import data.

- The disk i/o routines have been modified to use a bigger buffer size when reading 'fragmented' data such as stresses, as tests have shown that - at least on local disks - 'fewer, larger' reads are substantially faster than 'more, smaller' ones.

- Cut-section display has been speeded up generally.

- Contour plots have also been speeded up by detecting that a part is all one colour and sending it off to a 'shaded' routine which doesn't check for colour variation over each element and so renders more quickly.

No one thing above is a magic bullet, but the aggregate of them all makes the code a lot more responsive. In addition the graphics tuning available in V10.0 allows it to make better use of more modern hardware, which can improve graphics performance over 9.4 by a factor of 3 or more.

Spotwelding

- **Case 14826**

From version 10.0 onwards D3PLOT can now display spotwelds (all 5 types) using an option sphere symbol. The size of the spheres can either be fixed at a user defined size, or D3PLOT will use the underlying geometry and information in the ZTF to calculate the size of each sphere.

If a fixed sphere size is specified then the size of the sphere can be scaled automatically by the magnitude of the data value when a spotweld component is contoured.

T/his link

- **Case 15195**

From version 10.0 onwards the D3PLOT->T/HIS link can now have up to 100 'Locates' active at the same time. To make it easier to view multiple locates the default way in which they are drawn has changed so that a smaller cross hair (using 15% of the largest window dimension) is now drawn using the same colour and line style as the T/HIS curve it is linked to.

A new 'Locate' menu has been added to the D3PLOT Display Options menu that can be used to swap between the new shorter cross hairs, the original full screen cross hairs and a 3rd option to plot a coloured circle at the centre of each item. This menu also gives the option to draw everything in white (instead of the curve colours) and to adjust the size of the short cross hairs and circles.

- **Case 13109**

From version 10.0 onwards the '=> T/HIS' button in the top of the XY-Plotting menu will automatically start the D3PLOT->T/HIS link if it is not already

running. Once T/HIS has started it will then give the user the choice of transferring all of the curves to T/HIS or a subset of the curves.

User interface

- **Case 15134**

When trying to select a data component to plot from the popup menus, if the number of available components was long and the screen was not big enough, not all the components could be seen and therefore they could not be selected. This was especially noticeable for 'Extra' data components where the list of components can be long.

A scroll bar is now added to the popups if the number of rows in the popup is over a certain limit (25 by default).

The value for the number of rows can be set with the preference

d3plot*max_comp_popup_rows

Utilities

- **Case 15552**

The trace menu now allows the user to pick more than one entity at a time. This includes screen picking and typing in a range into the keyin textbox.

- **Case 15522**

The family size of ptf files created through the Utilities->Compress function can now be specified.

This allows the user to place all their results in a single file.

- **Case 14702**

The Utilities->Compress utility now has the option to write the results in a format which is ordered to make efficient use of D3Plots data reading routines. It is therefore faster to read than a normal ptf file, but will not be able to be read by other post-processing software.

Derived data components, Von Mises Stress, Von Mises Strain and Engineering Major and Minor Strains can be embedded in the file. This means that if the stress/strain tensor components used to derive them are not of interest, they can be omitted to save disk space.

LSDA (binout) data components can also be embedded in the file. The LSDA file can be large and the data components cannot be plotted until it has been read in, which can take in the order of minutes to do. By embedding them in the file they are available instantly.

The solid stress tensor and plastic strain components can be omitted in this reordered format.

- **Case 13727**

When a model was read into D3Plot it searched for Settings files to apply by looking for filenames in the format 'd3plot<nnn>.set', in the model, project, home and $OA_INSTALL directories (in that order). Now, if it doesn't find one, it will

also look for files in the format '<jobname>.set'.

Similarly, when a model was read in, D3Plot searched for Property files in the format '<jobname>_<nnn>.prp', in the model directory. If it doesn't find one it will now also look for files in the format '<jobname>.prp'.

- **Case 12405**

The Trace function can now be used to trace Airbag Particles and SPH elements. Their trajectories can also be exported to the XY plotter.

Volume clip

- **Case 16531**

A clipping volume can now be tied to a node, rather than defined with a coordinate, so that it moves with the model.

- **Case 15183**

Various enhancements for clipping volumes:

Once a clipping volume has been defined it can now be resized interactively on the screen by dragging 'handles' on the volume. The volume can also be repositioned by dragging it in the global X, Y and Z axes by pressing and holding the left, middle and right mouse buttons respectively. A 'Drag' button has been added to the menu to put it into drag mode.

Clipping volume definitions can now be saved and retrieved via a file which works the same way as the file for cut sections.

When clipping volumes were sketched they disappeared as soon as the screen updated. A new switch has been added to the panel to draw the volume, which is persistent until the user turns it off.

The menu has been reorganised so that all the options needed to define a volume are now on one panel. This should make creating and editing volumes quicker and easier.

Xy plot

- **Case 15203**

From version 10.0 onwards the following enhancements have been made to the XY-PLOT menu.

1) The curve labels in the XY-PLOT window now include the model number. Hover text has also been added to the buttons so that the complete curve label can be seen without having to resize the window.

2) As items are picked they will be labelled on the screen if the new options to label picked items is set (shortcut J or from the Options dropdown menu)

3) The =>T/HIS button at the top of the XY-PLOT window will now start the T/HIS D3PLOT link if it is not already running.

Ztf

- **Case 16043**

From version 10.0 onwards the optional additional files that D3PLOT reads can be specified on the command line.

-ztf=ZTF_file
-group=ASCII_group_file
-prop=properties_file
-set=settings_file

In addition to specifying these on the command line the Open Model menu has been modified to allow the user to select alternate sources for these files.

- **Case 4399**

From version 10.0 onwards the Entity Panel now contains an option to display names as well as labels.

If a ZTF file is read in containing the names of elements, nodes, rigidwalls, joints and parts then these can now be displayed as well as the ID's.

3.3 T/HIS

3.3.1 Enhancements in 10.0

Data access

- **Case 16602**

Version 10.0 of T/HIS now reads DBFSI data from the BINOUT (LSDA) file.

- **Case 16559**

T/HIS 10.0 can read the optional TRHIST ASCII file and the TRHIST data written to the LSDA (binout) file by LS-DYNA 971R5 and later.

- **Case 15518**

From version 10.0 onwards the routines that extract data from the LSDA (binout) file have been modified to make them faster when reading data for multiple items in one read operation. Reading data for one entity at a time or multiple data components for a single entity won't be any faster.

- **Case 14530**

T/HIS 10.0 now supports the output from the new *DATABASE_CPM_SENSOR option in LS-DYNA. The CPM_SENSOR data can be written out in 2 different formats to the LSDA and ASCII files and T/HIS should be able to read both formats.

- **Case 13668**

From version 10.0 onwards the labels for shell and thick shell stress and strain data components read from the LSDA (binout) file have been modified to include (local) to make it clear that these values are in the elements local coordinate system.

- **Case 12710**

From version 971R3 onwards the format of the RBDOUT data in the LSDA (binout) file was modified to take account of rigid bodies either being created or deleted during the analysis using *DEFORMABLE_TO_RIGID cards. T/HIS will now read both the original format and the new one. If the new format is found then only parts that are rigid at the start of the analysis will be offered to the user.

Fasttcf

- **Case 16502**

If the FAST-TCF command to write out curves to a file doesn't actually select any valid curves FAST-TCF now just generates a warning message and continues to play the script instead of exiting with an error.

- **Case 16341**

From version 10.0 onwards the FAST-TCF wildcard options for matching curve tags has been enhanced to make it easier to select curves for operations.

* - matches 1 or more characters
? - matches a single character
[a-e] - matches a single 'a','b','c','d' or 'e'
[ceg] - matches a single 'c','e' or 'g'

Examples :

curve_1? : matches curve_10, curve_11, curve_1a etc
curve_1?? : matches curve_100, curve_112, curve_1b1 etc
curve_[1-9]00 : matches curve_100, curve_200, curve_300

- **Case 16338**

From version 10.0 onwards the FAST-TCF commands for writing curves out to CSV files and T/HIS curve files have been modified so that a range of curves can be selected.

csv2 E:\test.csv #1:#100 auto

will write out curve numbers 1 to 100.

csv2 E:\test.csv #1:#20 #24 #30:#50 auto

will write out curves 1 to 20, curve 24 and curves 30 to 50.

This curve range option can only be used with explicit curve numbers (#n) and will not work with curve tags as curves can be tagged in an arbitrary order.

- **Case 14730**

The start and end times for the HIC, HIC(d) and 3ms operations can now be accessed in FAST-TCF scripts and output to a text file or as Reporter variables.

e.g. tab output.txt #1 hict1 start time for HIC

will output the time at the start of the HIC value to the output.txt file (change hict1 to hict2 to get the end time).

e.g var var_name_t1 #1 3mst1 start time for 3ms

will output the time at the start of the 3ms value to a reporter.var file for use in Reporter (change 3mst1 to 3mst2 to get the end time).

The HIC(d) times can be accessed with 'hicdt1' and 'hicdt2'.

Graphics

- **Case 15519**

From version 10.0 onwards new options have been added to T/HIS to set the background colour and %age transparency of the floating legend within a graph. These options are available in the menu interface, command line and FAST-TCF.

Menus

- **Case 16421**

When picking curves for any curve operations in T/HIS the right click menu is now active in version 10.0 and allows all the normal curve operations except for delete.

- **Case 16196**

From version 10.0 onwards the popup menu for each curve in the curve manage window now include an EDIT option which will load the curve into the curve EDIT menu.

Operations

- **Case 16554**

The method for calculating the Acceleration Severity Index (ASI) has been updated in BS EN 1317-1:2010 and is now the default in T/His. Previously it used the method in BS EN 1317-1:1998.

The ASI menu has two options to switch between the new method and the old one. A preference 'asi_method' has been added to set the default method.

- **Case 15835**

The MAX, MIN, ENV, AVE and SUM operations required that all the x-values of the selected curves matched up.

Now each curve can have a different number of x-values and the intervals between each point can be different. Where curves have dissimilar x-values, interpolation is used to match up points.

- **Case 15661**

Some of the labels that T/His produced after an operation involving more than one curve were generic, e.g. Sum (y), Quotient, etc and if many curves were operated on simultaneously, lots of identically named curves were produced making them difficult to work with.

T/His now keeps the name of the curve in the first group and appends the curve operation on the end as well as the curve ids, e.g. if curves #1 and #2 are added together using the Add(y) operation the resulting label will be:

' (#1 + #2 (y))'

For operations that use only one curve the original name is kept and the operation is appended.

When picking a point on a curve with the POINT command the label of the curve selected is now written to the dialogue box as well as the menu as long curve names do not always fit in the menu.

- **Case 14720**

From version 10.0 onwards the history of operations used to create a curve can be viewed and edited. Curve operations that require constants as inputs can have the input values changed and new operations can be inserted into the history. After editing a curves history the curve can be re-generated automatically along with any curves that used the curve that has been modified as an input.

- **Case 14168**

A new operation 'RES' has been added in to T/His to calculate the resultant of any number of curves using the formula Sqrt(f(y1)^2 + f(y2)^2 + ... + f(yn)^2).

- **Case 12501**

Curves can now be sorted alphabetically by label in the curve manager.

Read

- **Case 15304**

In version 10.0 the option to read multiple ISO curves now scans the contents of the index file and builds a list of all the available channel files. The user can then select which channels he wants to read instead of reading all of them.

Since the filenames are not much use the user can choose to either display the filenames or the ISO channel names.

- **Case 14462**

Version 10.0 of T/HIS now supports the TRHIST ASCII database file generated by LS-DYNA that contains information for tracer particles defined using the *DATABASE_TRACER option

User interface

- **Case 16287**

From version 10.0 onwards the EDIT menu has been modified so that once you have started to edit a curve you are locked out from the other T/HIS menus (dynamic viewing will still work) until you either exit or quit from the edit operation. This has been done to stop users deleting/modifying the contents of a curve that is also being edited.

- **Case 16021**

Version 10.0 of T/HIS has been modified so that if you are working with multiple pages and you change the page the list of 'active' graphs is automatically updated to the graphs on the current page. Any changes the user makes will then only apply to the graphs the user can see.

The option to select all the graphs can still be used after changing page if the user wants to update/modify all the graphs including any not on the current page.

- **Case 14894**

In version 10.0 a new 'curve_palette' preference option has been added which controls the number of colours T/HIS uses by default for curves. This preference can be set to

DEFAULT - Use the original 6 colours
EXTENDED - Use the first 13 colours
NO_GREY - Use all the colours apart from the 3 grey ones
FULL - Use all 30 predefined colours + any user defined ones.

As well as being set using a preference option the 'curve palette' can also be changed interactively using either the 'Style' menu or the 'General' tab in the 'Settings' menu.

- **Case 14587**

From version 10.0 onwards the right mouse button Quick-Pick menu now contains a 'Save As' option that can be used to write the curves that have been selected to a file in one of the following formats.

T/HIS Curve
LS-DYNA Keyword
NASTRAN TABLED1
CSV (X,Y,X,Y,X,Y)

Write

- **Case 16279**

The option that writes curves out in the LS-DYNA Keyword format has been modified so that it now writes out the curve using the *DEFINE_CURVE_TITLE option (using the curve label as the title) instead of *DEFINE_CURVE.

- **Case 15520**

There is now an option to Write a summary file in CSV format, accessed in the 'Write' menu from the 'Write output' popup.

3.4 Reporter

3.4.1 Enhancements in 10.0

Annotation

- **Case 13825**

A note object has been added to Reporter. This only appears in the design view and allows users to add notes to provide information to themselves or others.

Conditional formatting

- **Case 9026**

Setting the background colour of various object types via conditional formatting has been added.

Graphics

- **Case 15509**

You can now evenly distribute items horizontally and vertically on the page or within the selected items.

- **Case 15503**

You can now add an outline border to “Oasys” object images.

- **Case 15482**

Added the ability to align Reporter items with each other or the page. Also added the ability to evenly distribute Reporter items with each other or the page.

Image

- **Case 15451**

Increased the number of pixels that can be cropped from an image edge from 1000 to 10000.

Multiple selection

- **Case 9019**

With multiple objects selected it is now possible to align the objects to the left, centre, right, top, middle or bottom of the page.

- **Case 8980**

Added multiple selection to Reporter. You can now:

1) Select multiple items by either holding down the SHIFT/CTRL key and clicking on items or by dragging a selection box over a number of items.

2) You can cut/copy/paste/delete multiple selected items.

3) Multiple items can be saved/imported.

4) Multiple items can be generated.

5) Multiple items can be sent to the back or brought to the front. In doing this the selected items’ relative hierarchy is maintained.

6) Multiple items can be translated around the page by dragging.

7) When using the resize handles on an item when multiple items are selected the other items are resized according to the relative size to the 'master' item.

Preferences

- **Case 15529**

Added preferences to allow the user to specify the format of the default DATE and TIME variables.

- **Case 13817**

Snap size, grid size and nudge distance have been added as preferences to reporter.

Scripting

- **Case 9031**

The output from a library program can now be written to a variable.

Shortcut

- **Case 9333**

The 'p' key can now be used to flip between design view and presentation view.

Tables

- **Case 15546**

Any drag operation on a table item forced a recalculation of the column widths/row heights. Two changes have been made:

1) Column widths/row heights are only recalculated if the drag event is due to the resize handles, not just a drag translate.

2) If you do use the drag handles then the widths/heights are recalculated based on change in size of the table - i.e. the relative size of the column widths/row heights is maintained.

- **Case 15319**

It is now possible to set the background colour of cells in tables.

Unicode

- **Case 15436**

Reporter can now read unicode arguments (e.g. variable values) from the command line and arguments file.

More exactly, when reading arguments from the command line Reporter reads text using the default 8bit encoding for the machine locale rather than latin-1 encoding.

When reading from an argument file it does the same but is also capable of detecting a UTF-16 encoded file and reading that as well.

User interface

- **Case 15530**

The escape key can now be used to deselect any selected objects. It is still used to quit out of full screen mode.

- **Case 15516**

Holding the control key when using a scroll wheel on a mouse will now zoom in and out of the page.

- **Case 15513**

The number of pages is now displayed at the top of the screen, not just the current page.

- **Case 13863**

'Fit-view' is now the default zoom level when opening a file.

Variables

- **Case 15476**

A new library script has been added to create variables from information in a CSV file.

- **Case 15453**

The default variable %DATE% now just shows the date rather than the date and time. Another default variable called %TIME% has been added to display the current time.

- **Case 15452**

Variables can now be inserted into a number of text box inputs using the right click->insert variable.

- **Case 13867**

The format and precision of a displayed variable value can now be set in the variable string written in a text box/table cell etc. For example %HIC(2f)% will display the valuable HIC value to 2 decimal places.

- **Case 8819**

Added the ability to format a variable globally in Reporter - this is done through the variable edit panel.

Write

- **Case 15955**

When running from the command line Reporter would always ask to confirm overwriting a reporter file if you have chosen to write out a reporter file, and a previous one exists. This has been changed so that you do not have to confirm this.

3.5 Shell

3.5.1 Enhancements in 10.0

General

- **Case 16441**

From version 10.0 onwards the 'Kill' menu in the job submission panel contains a new 'Quit' option. This option will make LS-DYNA terminate without writing any restart files.

Model build

- **Case 16728**

The shell can now accept drive mappings from the oa_pref file, e.g. oasys*drive_a: <dir to map>.

This means that the same *.lst (listing) file can now be used for submitting runs on a Unix cluster and post-processing results in Reporter on a PC.

User interface

- **Case 14282**

Users have complained that when they select a version of Dyna and then change SMP/MPP or single/double precision, the version of Dyna gets reset to the first on the list.

The order of the buttons are now set out more logically to make this less likely to happen. The SMP/MPP buttons are now on the left of the GUI working through to the version popup on the right.